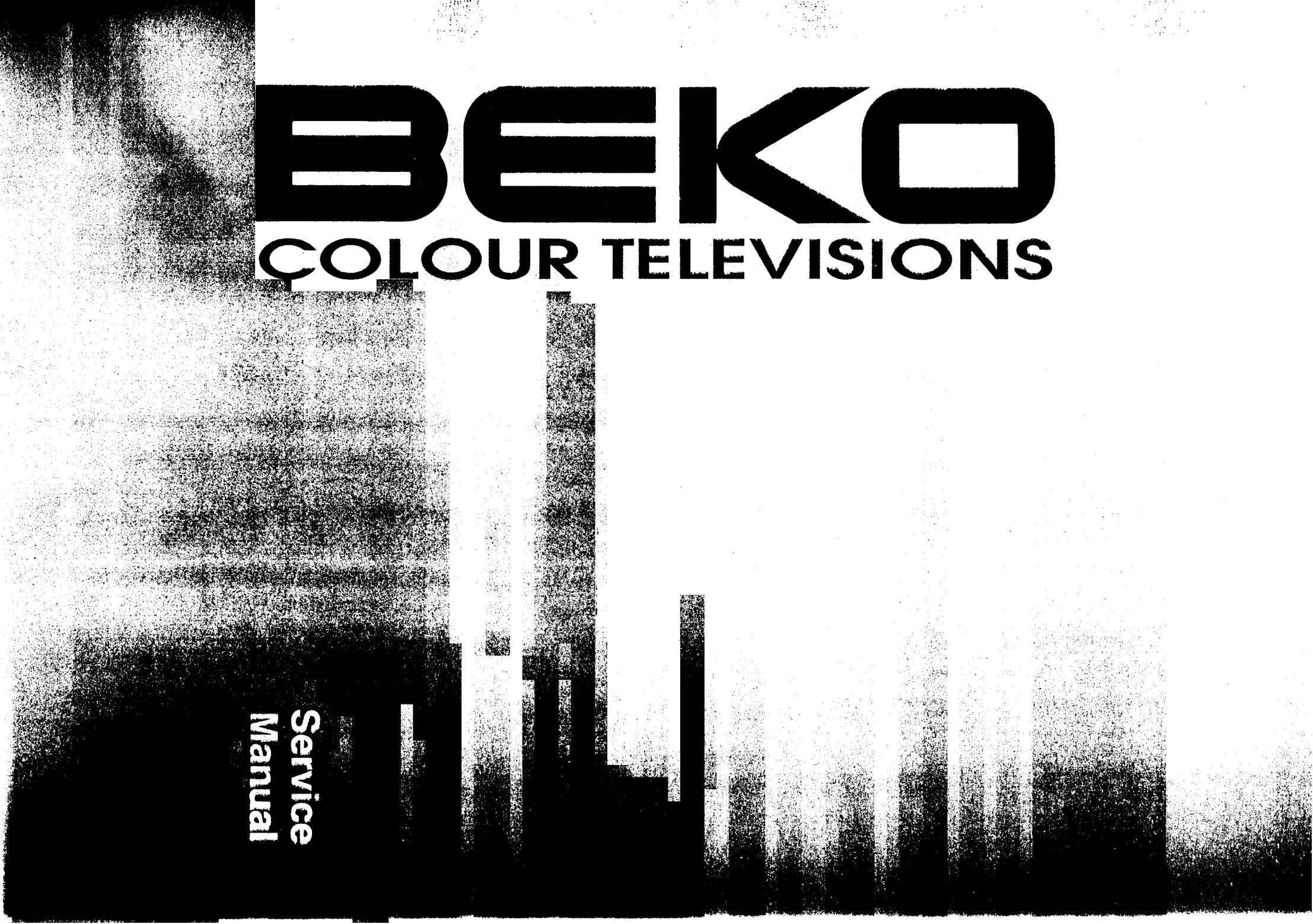
# BEKO

## COLOUR TELEVISIONS



Service Manual

# OPERATION INSTRUCTIONS

## CONNECTIONS
Connect the mains plug into the mains socket, 220V AC, 50/60 Hz.

Connect the aerial lead to the aerial socket (75 ohm coaxial) at the back.

## ON SCREEN DISPLAY
This function is automatically displayed on the TV screen whenever a control is pressed. It shows you what is happening by a series of graphics moving left (decrease) or right (increase). If you wish the setting to become permanent (normal), press the "MEMORY" button, a prompt message "MEMORY ?" will be displayed on the screen, to confirm, press the "MEMORY" button twice then setting new levels.

## TV STANDARD SELECTION
Press the TV-Standard . PAL/SECAM, SECAM DK etc. will be displayed on the screen. After selection press the MEMORY button, a prompt message "MEMORY ?" will be displayed, press MEMORY button once more (Within four seconds) and the selected standard will be stored.

## TUNING

## METHOD 1:
To select a program, first press SEARCH button and either UP or DOWN buttons. The tuner will automatically search and locate all valid channels being broadcast. To store these individual channels press the button marked MEMORY, a prompt message "MEMORY ?" will be displayed on the screen : Press MEMORY button once more (within four seconds) and that individual channel will be stored in the memory. Repeat operation untill all channels have been found and stored.

## METHOD 2:
If the channel numbers are known, obtain "C.." at the upper right corner of the screen by either pressing PR/CH on Remote Control Handset or CHANNEL button on TV set. Select the channel number with Remote Control handset by using ten Key buttons. Press the MEMORY button, a prompt message "MEMORY ?" will be displayed, press MEMORY button once more (within 4 seconds) and that individual channel will be stored in the memory.

## FINE TUNING
The button marked "F TUNE" on the television or the handset will allow you to manually gain the optimum reception within the badwidth, should the auto search facility not tune the channel to your satisfaction.

## PICTURE ADJUSTMENTS
The following 3 controls should be used in conjunction with each other to give you a well balanced picture without any glare.

### Contrast
Press the button marked "CONTRAST" to adjust light and dark shades.

### Brightness
Press the button marked "BRIGHT" to ensure overall clarity of definition.

### Colour
Press the button marked "COLOUR" to ensure all objects are seen in their natural colours.

## VOLUME CONTROL
Press the button marked "VOLUME" on the hadset or "volume + up" on the control panel to increase the volume. By pressing the button marked "volume" or " volume + down", will decrease the volume.

## DECADAL CONTROL
The buttons marked "1-, 2-, 3-, are to be used if you require to go to a programme exceding number 9, ie should you require programme 23, press "2- +3" and it will instantly take you to programme 23.

## DISPLAY

The button marked "DISPLAY" on the handset, will show the programme number that you are currently viewing, in the top right corner of the television screen.

## SLEEP/TIMER

Adjacent to the display button is the TIMER. This will give you the option of automatically switching the television to STANDBY after a period of 30, 60, 90 or 120 minutes. When the word "OFF" is displayed on screen or if the receiver is switched OFF/STANDBY, the timer settings will be cancelled.

## MUTE

The button marked "MUTE" on the handset, will prevent any sound being emitted from the speakers, and the word "MUTE" will be displayed on screen until this button has been pressed again, whereupon previous volume levels are restored.

## NORMAL SETTINGS

When the receiver is first switched ON or whenever the "NORMAL" button is pressed., all picture and sound adjustments should be as you -prefer them- this is provided that you have initially adjusted them to your satisfaction and stored these settings in the electronic memory. They will always revert to these settings even if temporarily altered to suit unusual reception conditions etc (provided the temporary settings have not been memorised).

## MEMORY / STORE

This button, when pressed twice (within 4 seconds), will override any previous control setting if used in conjunction with a particular control. To memorise any alteration, press the "MEMORY" BUTTON once, the receiver will advise it will accept this command by displaying "memory?", to confirm press "MEMORY" once more. This new setting will then be regarded as permanent or normal.

## STANDBY

The button marked " ⏻ " allows you to switch the television to "standby". This control shuts down all functions except a sensory circuit. To return to television programmes either press the standby button again or key in a valid programme number by using the numeric pad on the handset. It should be noted that the television is "not" switched off in this mode. If you are not going to use the television for long periods of time, it is recommended that you switch the power on the television to "OFF" and remove the mains plug from the socket.

## AUDIO VIDEO CONNECTIONS

When the button marked "AV" is pressed, it enables you to connect most types of VCR's, Computers and Satellite Receivers to this television, either directly to the aerial socket or by the SCART connector.

## SCART - EUROSOCKET

The term SCART or Eurosocket is a 21 pin connector, recognised by International Standards, which will allow you to connect any relevant equipment, regardless of make or country or origin, to this television and will operate according to manufacturers specification.

## VIDEO CONNECTION

This television has been produced so that a video recorder can be connected direct to the aerial socket, by using the standard co-axial lead supplied with all makers V.C.R.

Follow the instructions from the VCR to connect the 2 units togethernd switch on the VCR's test signal or play a pre-recorder video cassette. Tune the television to the signal from the VCR. This will usually be either channel 36 or 37, however, check the information plate at the rear of the VCR. Although you can store the video tuning position to any channel, we suggest that you store the video on channel "0", to prevent any confusion of possible new channel additions.

It should be noted that some makers of VCR's, Computers and Satellite receivers etc, will automatically switch the television into "AV" mode. If this happens then you must obviously disregard the previous instruction to manually select "AV".

# CIRCUIT DESCRIPTIONS

## 1.1 GENERAL

Chassis AT-2 has a modular designed frequency synthesis tuning and control system which can be used in a wide range of TV receivers. The system involves frequency tables of standars B/G-D/K channels.
The basic system, providing 40 permanently stored programmes, local control of main TV functions and display of programme, channel number and analogue values on the screen (OSD) can be realized with only four integrated circuits.:

| | |
|---|---|
| Microcontroller | SDA 20160 |
| Nonvolatile memory | SDA · 2526 |
| OSD-IC (NEC) | 6142 |

IR remote control of all TV functions is possible if two additional ICs are used:

| | |
|---|---|
| IR TRANSMITTER | SDA 2208 |
| IR PREAMPLIFIER | SDA 4050B |

Teletext function may be included by using the following devices:

| | |
|---|---|
| Data slicer | SDA5231 |
| Teletext decoder | SDA5243 |
| Memory device | 8k*8 |

## 1.2 SALIENT FEATURES

Frenguency synthesis tuning (62.5kHz steps)
Channels correspending to standard B/G · D/K.
Software protection against tube flashovers
40 programs selectable by directly entering a programme number or by up/down function.
Channel selection by directly entering a channel number or up/down function.
Channel search function in two directions.
Nonvolatile memory for 40 programme and optimal analogue values.
128 step fine tuning.
Local control (14/13 Keys)
IR remote control
Control lines for AV (programmes 0,AV,39)
Display of programme number, channel number, analogue values, mute illustrated by OSD (On screen display).
Automatic muting if no carrier detected.
Automatic switch-off when carrier disappears for more than 5 minutes
Sleep-timer (30,60,90, 120 min)
Full telext control
Linked page control (row 27)
Pin programmable tuner-selection
Broadcasting standard selection.

## 1.3 CONTROL COMPONENTS

In the following sections abbreviated reference data of the control components is given. For more detailed information use corresponding data sheets.

### 1.3.1 MICROCONTROLLER SDA 20160

The SDA20160 is an one-chip microcontroller with an 8 bit CPU, 16 kByte code memory (ROM), 256 byte date memory (RAM), two independent 16 bit timers/counters, a five-source/two-priority-level nester interrupt structure and four on chip D/A converters. Manufactured in NMOS silicon gate technology and working with a single 5 Volt supply voltage it has a cycle time of 1 S (crystal frequency 12MHz) with one, two or four cycles per instruction. A total of up to 34 digital I/0 lines are available, configurated as four 8 bit ports (port0 to port3) and the serial IIC bus interface with clock (SCL) and data (SDA) line. Port 3 is a multifunction port. All special functions can be enabled/disabled by software. P3.0 input is able to process signals modulated with approx. 30 kHz. It contains a digital demodulator deriving the envelope curve from a modulated digitial signal and can be used as an input for infrared transmitter signals. Further port3 includes two interrupt inputs and two counter inputs. Port 1 also contains four multifunction lines which can be used either as normal port input/output or as PWM (pulse width modulated) outputs, controlled by the four on-chip D/A converters. For the application a special software has been located in the microcontroller ROM. Fig1 shows a pinning diagram of the SIESTA-OSD microcontroller, named SDA 20160. The SDA 20160 microcontroller is housed in a DIP 40 package.

### 1.3.2 NONVOLATILE MEMORY SDA 2516/2526

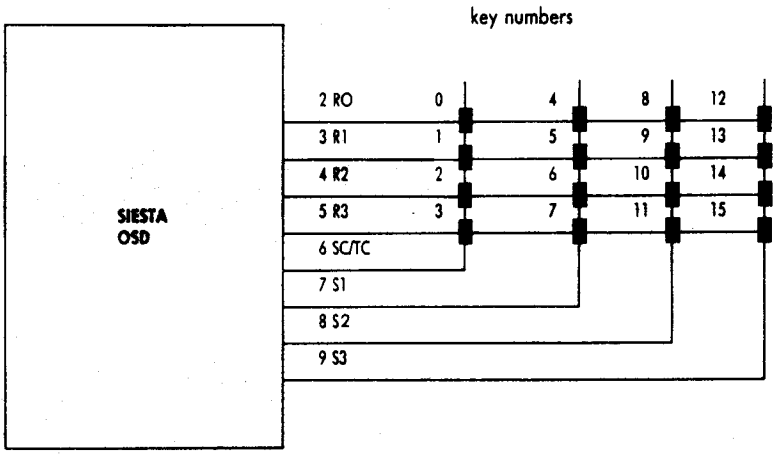
The SDA 2516 and SDA 2526 are nonvolatile, electrically programmable and eraseable memory devices 128* 8 bit rsp. 256 * 8 bit (SDA 2526) memory size. Data transfer is done via an IIC bus interface. Programming time is typically 15ms. Data retention is unlimited and independent of power-on or power-off status. The number of reprogramming cycles per address is greater than 1000. SDA 2516 and SDA 2526 are manufactured in MOS technology and mounted in a DIP 8 case.

### 1.3.3 INFRARED PREAMPLIFIER TDA 4060

The bipolar integrated circuits TDA 4060 is designed for universal use as preamplifier for infrared remote control signals. The TDA 4060 uses only a single 5V supply.

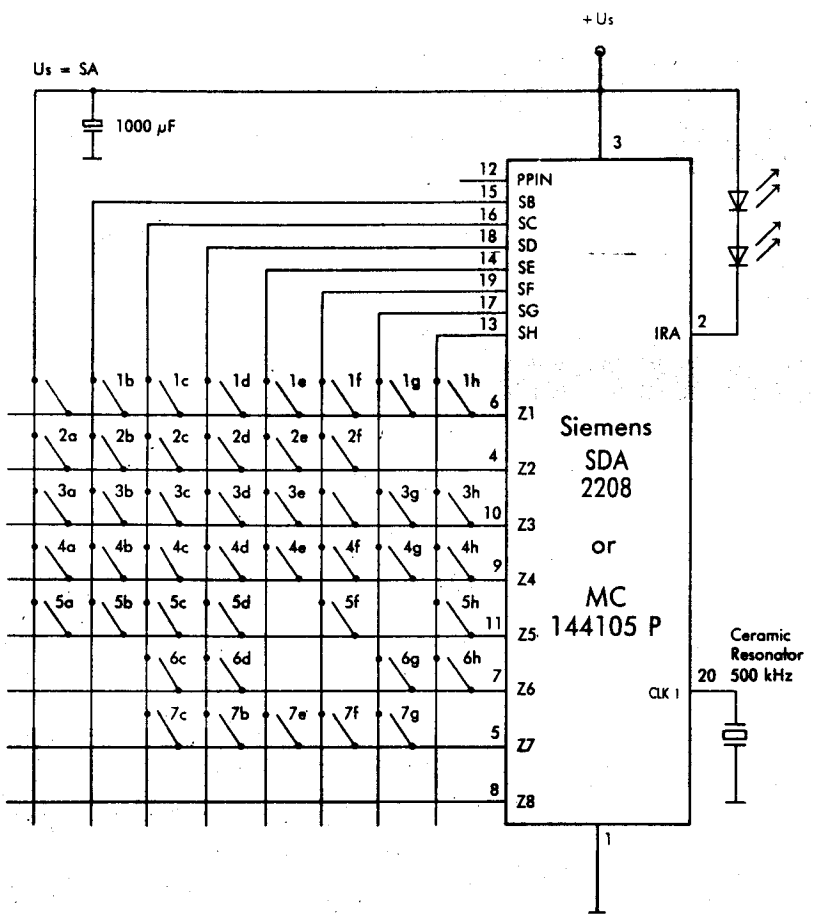
### 1.3.4 IR TRANSMITTER SDA 2208

The IR transmitter circuit SDA 2208, manufactured in a bipolar technology converts instructions obtained from an 8*§ keyboard matrix to a 9 bit bipolar phase code. The keyboard matrix could be enlarged to an 8*64 array by means of shift keys or additional working, so a total of 512 different instructions could be transmitted. As including an on-chip IR diode driver, the IR transmitter diode (s) are directly connected to the SDA 2208. The keyboard is completely locked against multiple closure. The internal oscillator is controlled by an AM-IF ceramic resonator or by an existing clock signal (430..530kHz). Current consumption during operation is typically 10mA (supply voltage 4...10V) When no key on the board is pressed (standby) the SDA 2208 is produced in a DIP 20 case.

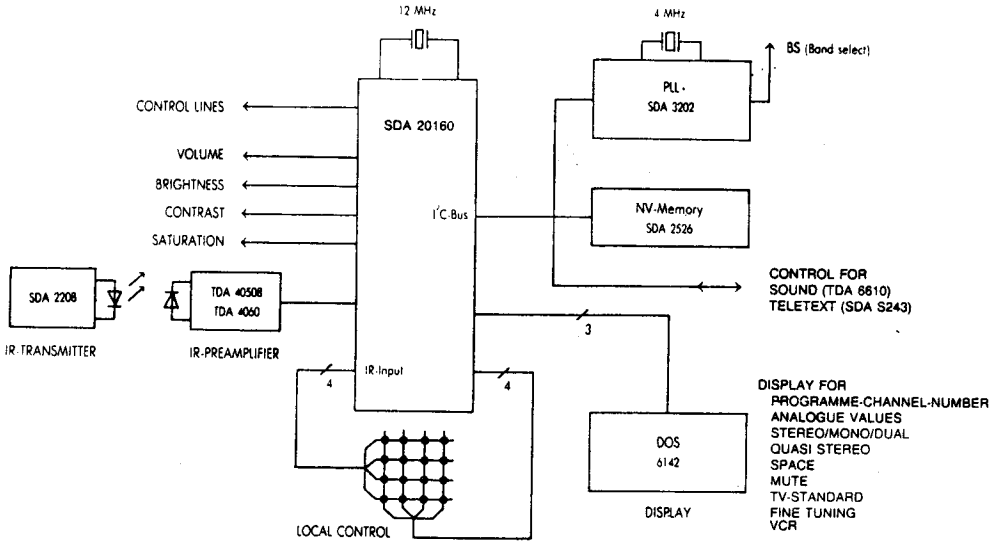



| key no. | Function |
|---|---|
| 1 | off/on |
| 2 | store |
| 3 | down |
| 4 | up |
| 5 | AF mode |
| 6 | search |
| 7 | channel |
| 8 | programme |
| 9 | scart |
| 10 | volume |
| 11 | TV-standard |
| 12 | finetuning |
| 13 | saturation |
| 14 | contrast |
| 15 | brightness |

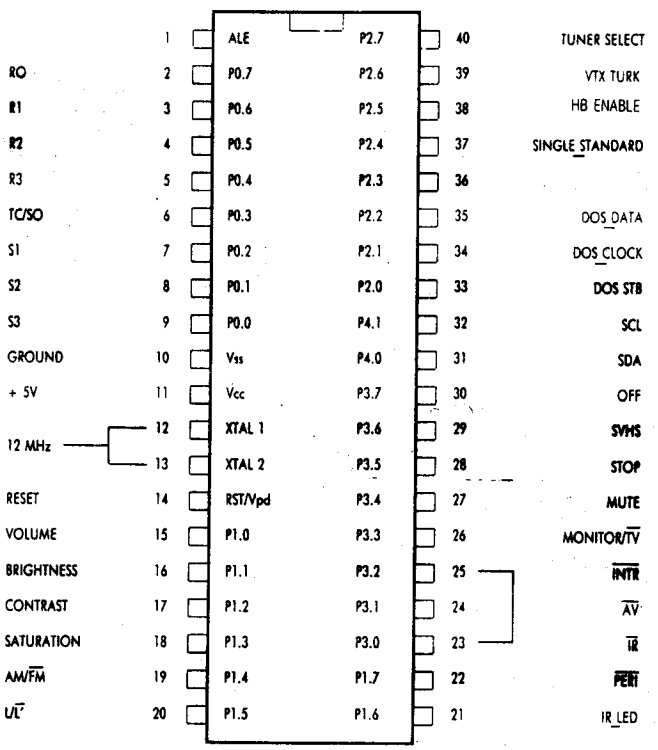
**LOCAL CONTROL BLOCK DIAGRAM**



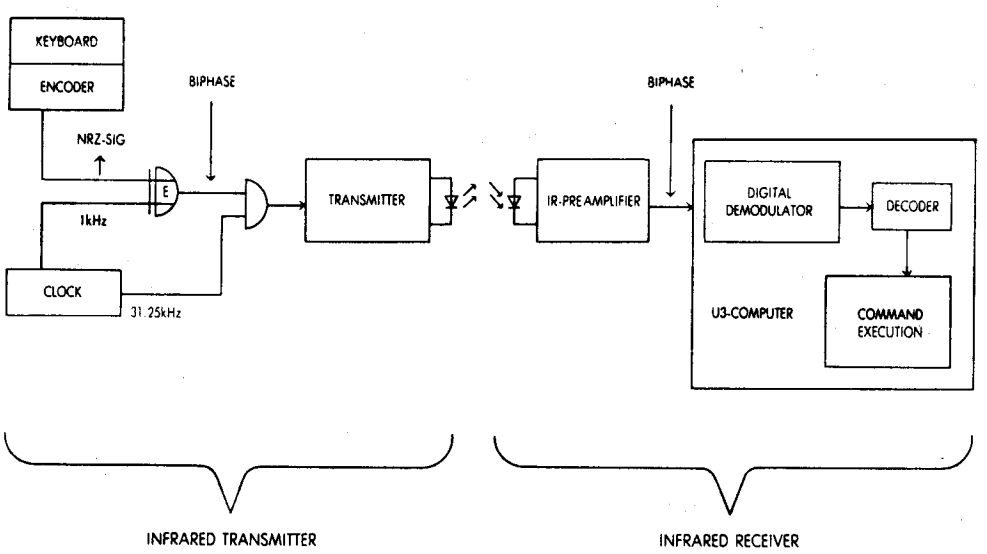

**CIRCUIT FOR IR TRANSMITTER SDA 2208**




## SYSTEM BLOCK DIAGRAM


1 ALE P2.7 40 TUNER SELECT
RO 2 P0.7 P2.6 39 VTX TURK
R1 3 P0.6 P2.5 38 HB ENABLE
R2 4 P0.5 P2.4 37 SINGLE STANDARD
R3 5 P0.4 P2.3 36
TC/SO 6 P0.3 P2.2 35 DOS DATA
S1 7 P0.2 P2.1 34 DOS CLOCK
S2 8 P0.1 P2.0 33 DOS STB
S3 9 P0.0 P4.1 32 SCL
GROUND 10 Vss P4.0 31 SDA
+ 5V 11 Vcc P3.7 30 OFF
12 MHz 12 XTAL 1 P3.6 29 SVHS
13 XTAL 2 P3.5 28 STOP
RESET 14 RST/Vpd P3.4 27 MUTE
VOLUME 15 P1.0 P3.3 26 MONITOR/TV
BRIGHTNESS 16 P1.1 P3.2 25 INTR
CONTRAST 17 P1.2 P3.1 24 AV
SATURATION 18 P1.3 P3.0 23 IR
AM/FM 19 P1.4 P1.7 22 PERI
U/L 20 P1.5 P1.6 21 IR LED

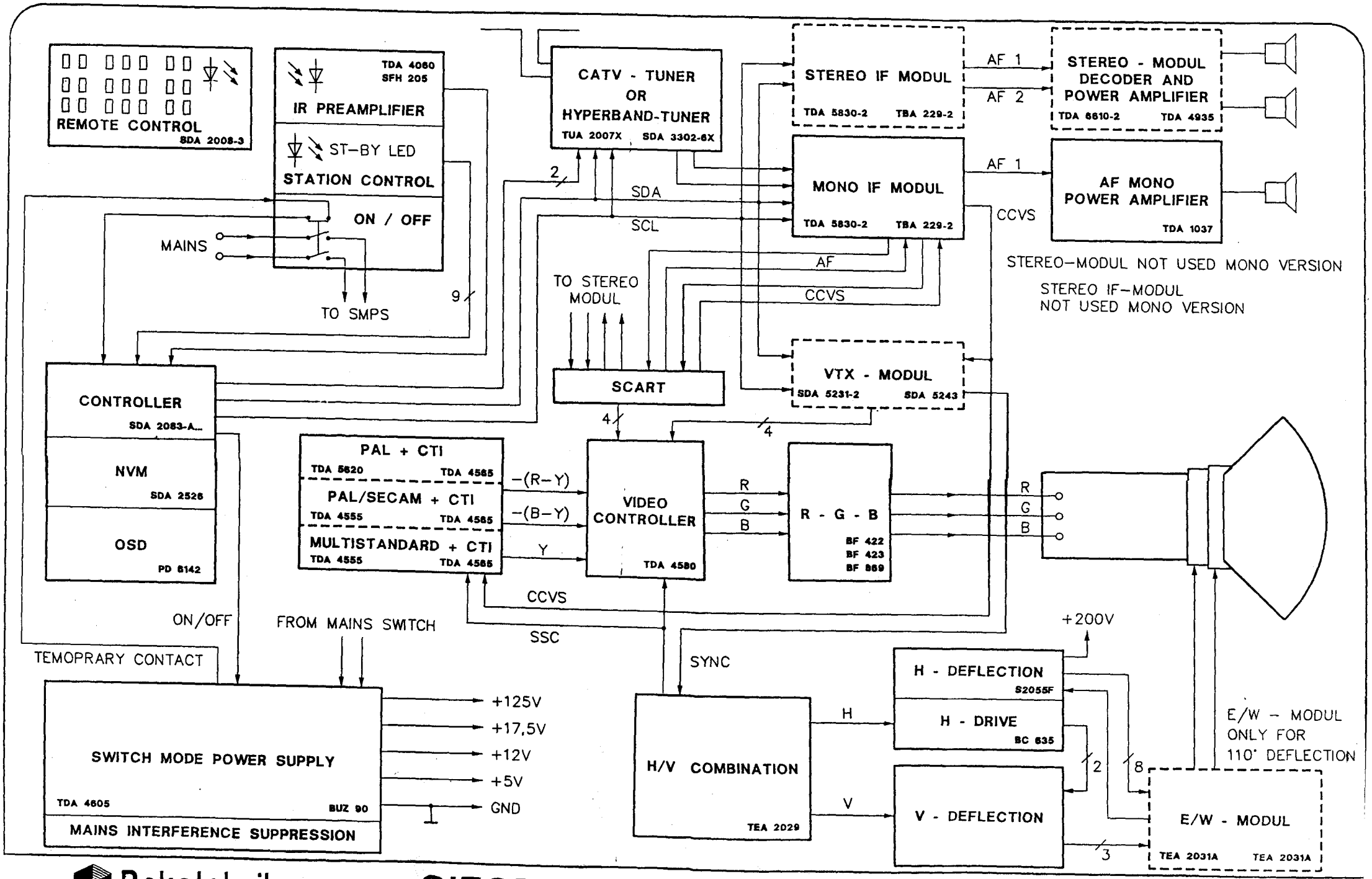
## MICROCONTROLLER PIN CONFIGURATION




## IR REMOTE CONTROL BLOCK DIAGRAM

# CHANNEL TABLE FOR STANDARD B/G (CCIR)

| Channel number (display) | Channel design. | Centre frequency (MHz) | Oscillator frequency (MHz) | Division ratio PLL (decimal) |
|---|---|---|---|---|
| 01 | AU 0 | 46.25 | 85.125 | 1,362 |
| 02 | K2 | 48.25 | 87.125 | 1,394 |
| 03 | K3 | 55.25 | 94.125 | 1,506 |
| 04 | K4 | 62.25 | 101.125 | 1,618 |
| 05 | K5 | 175.25 | 214.125 | 3,426 |
| 06 | K6 | 182.25 | 221.125 | 3,538 |
| 07 | K7 | 189.25 | 228.125 | 3,650 |
| 08 | K8 | 196.25 | 235.125 | 3,762 |
| 09 | K9 | 203.25 | 252.125 | 3,874 |
| 10 | K10 | 210.25 | 249.125 | 3.986 |
| 11 | K11 | 217.25 | 256.125 | 4,098 |
| 12 | K12 | 224.25 | 263.125 | 4,210 |
| 13 | A | 53.75 | 92.625 | 1,482 |
| 14 | B | 62.25 | 101.125 | 1,618 |
| 15 | C | 82.25 | 121.125 | 1,938 |
| 16 | D | 175.25 | 214.125 | 3,426 |
| 17 | E | 183.75 | 222.625 | 3,562 |
| 18 | F | 192.25 | 231.125 | 3.698 |
| 19 | G | 201.25 | 240.125 | 3.842 |
| 20 | H | 210.25 | 249.125 | 3.986 |
| 21 | K21 | 471.25 | 510.125 | 8,162 |
| 22 | K22 | 479.25 | 518.125 | 8,290 |
| 23 | K23 | 487.25 | 526.125 | 8,418 |
| 24 | K24 | 495.25 | 534.125 | 8,546 |
| 25 | K25 | 503.25 | 542.125 | 8,674 |
| 26 | K26 | 511.25 | 550.125 | 8,802 |
| 27 | K27 | 519.25 | 558.125 | 8,930 |
| 28 | K28 | 527.25 | 566.125 | 9.058 |
| 29 | K29 | 535.25 | 574.125 | 9,186 |
| 30 | K30 | 543.25 | 582.125 | 9,314 |
| 31 | K31 | 551.25 | 590.125 | 9,442 |
| 32 | K32 | 559.25 | 598.125 | 9.570 |
| 33 | K33 | 567.25 | 606.125 | 9,698 |
| 34 | K34 | 575.25 | 614.125 | 9,826 |
| 35 | K35 | 583.25 | 622.125 | 9,954 |
| 36 | K36 | 591.25 | 630.125 | 10,082 |
| 37 | K37 | 599.25 | 638.125 | 10,210 |
| 38 | K38 | 607.25 | 646.125 | 10,338 |
| 39 | K39 | 615.25 | 654.125 | 10,466 |
| 40 | K40 | 623.25 | 662.125 | 10,594 |
| 41 | K41 | 631.25 | 670.125 | 10,722 |
| 42 | K42 | 639.25 | 678.125 | 10,850 |
| 43 | K43 | 647.25 | 686.125 | 10,978 |
| 44 | K44 | 655.25 | 694.125 | 11,106 |
| 45 | K45 | 663.25 | 702.125 | 11,234 |
| 46 | K46 | 671.25 | 710.125 | 11,362 |
| 47 | K47 | 679.25 | 718.125 | 11,490 |
| 48 | K48 | 687.25 | 726.125 | 11,618 |
| 49 | K49 | 695.25 | 734.125 | 11,746 |
| 50 | K50 | 703.25 | 742.125 | 11,874 |
| 51 | K51 | 711.25 | 750.125 | 12,002 |
| 52 | K52 | 719.25 | 758.125 | 12,130 |
| 53 | K53 | 727.25 | 766.125 | 12,258 |
| 54 | K54 | 735.25 | 774.125 | 12,386 |
| 55 | K55 | 743.25 | 782.125 | 12,514 |
| 56 | K56 | 751.25 | 790.125 | 12,642 |
| 57 | K57 | 759.25 | 798.125 | 12,770 |
| 58 | K58 | 767.25 | 806.125 | 12,898 |
| 59 | K59 | 775.25 | 814.125 | 13,026 |
| 60 | K60 | 783.25 | 822.125 | 13,154 |
| 61 | K61 | 791.25 | 830.125 | 13,282 |
| 62 | K62 | 799.25 | 838.125 | 13,410 |
| 63 | K63 | 807.25 | 846.125 | 13,538 |
| 64 | K64 | 815.25 | 854.125 | 13,666 |
| 65 | K65 | 823.25 | 862.125 | 13,794 |
| 66 | K66 | 831.25 | 870.125 | 13,922 |
| 67 | K67 | 839.25 | 878.125 | 14,050 |
| 68 | K68 | 847.25 | 886.125 | 14,178 |
| 69 | K69 | 855.25 | 894.125 | 14,306 |
| 70 | EX | 863.25 | 902.125 | 14,434 |
| 71 | EX | 871.25 | 910.125 | 14,562 |
| 72 | EX | 879.25 | 918.125 | 14,690 |
| 73 | EX | 887.25 | 926.125 | 14,818 |
| 74 | EX | 69.25 | 108.125 | 1,730 |
| 75 | EX | 76.25 | 115.125 | 1,842 |
| 76 | EX | 83.25 | 122.125 | 1,954 |
| 77 | EX | 90.25 | 129.125 | 2,066 |
| 78 | EX | 97.25 | 136.125 | 2,178 |
| 79 | 20I | 59.25 | 98.125 | 1,570 |
| 80 | 50I | 93.25 | 132.125 | 2,114 |
| 81 | S1 | 105.25 | 144.125 | 2,306 |
| 82 | S2 | 112.25 | 151.125 | 2,418 |
| 83 | S3 | 119.25 | 158.125 | 2,530 |
| 84 | S4 | 126.25 | 165.125 | 2,642 |
| 85 | S5 | 133.25 | 172.125 | 2,754 |
| 86 | S6 | 140.25 | 179.125 | 2,866 |
| 87 | S7 | 147.25 | 186.125 | 2,978 |
| 88 | S8 | 154.25 | 193.125 | 3,090 |
| 89 | S9 | 161.25 | 200.125 | 3,202 |
| 90 | S10 | 168.25 | 207.125 | 3,314 |
| 91 | S11 | 231.25 | 270.125 | 4,322 |
| 92 | S12 | 238.25 | 277.125 | 4,434 |
| 93 | S13 | 245.25 | 284.125 | 4,546 |
| 94 | S14 | 252.25 | 291.125 | 4,658 |
| 95 | S15 | 259.25 | 298.125 | 4,770 |
| 96 | S16 | 266.25 | 305.125 | 4,882 |
| 97 | S17 | 273.25 | 312.125 | 4,994 |
| 98 | S18 | 280.25 | 319.125 | 5,106 |
| 99 | S19 | 287.25 | 326.125 | 5,218 |
| 00 | S20 | 294.25 | 333.125 | 5,330 |
| C0 | S21 | 303.25 | 342.125 | 5,474 |
| C1 | S22 | 311.25 | 350.125 | 5,602 |
| C2 | S23 | 319.25 | 358.125 | 5,730 |
| C3 | S24 | 327.25 | 366.125 | 5,858 |
| C4 | S25 | 335.25 | 374.125 | 5,986 |
| C5 | S26 | 343.25 | 382.125 | 6,050 |
| C6 | S27 | 351.25 | 390.125 | 6,242 |
| C7 | S28 | 359.25 | 398.125 | 6,370 |
| C8 | S29 | 367.25 | 406.125 | 6,498 |
| C9 | S30 | 375.25 | 414.125 | 6,626 |
| CC | S31 | 383.25 | 422.125 | 6,754 |
| E0 | S32 | 391.25 | 430.125 | 6,882 |
| E1 | S33 | 399.25 | 438.125 | 7.010 |
| E2 | S34 | 407.25 | 446.125 | 7,138 |
| E3 | S35 | 415.25 | 454.125 | 7,266 |
| E4 | S36 | 423.25 | 462.125 | 7,394 |
| E5 | S37 | 431.25 | 470.125 | 7,522 |
| E6 | S38 | 439.25 | 478.125 | 7,650 |
| E7 | S39 | 447.25 | 486.125 | 7,778 |
| E8 | S40 | 455.25 | 494.125 | 7,906 |
| E9 | S41 | 463.25 | 502.125 | 8,034 |




Bokotoknik SIESTA BLOCKDIAGRAMM

# SAFETY INSTRUCTIONS

## SAFETY-PRECAUTIONS

WARNING: The following precautions should be observed.

1. Although the chassis is isolated from the mains supply, some areas of the main PCB are at mains potential. An isolation transformer (250-500 VA) should therefore be connected between the mains and the receiver before service is attempted.

2. Do not install, remove, or handle the picture tube in any manner unless safety, goggles are worn. People not equipped should be kept away while picture tubes are handled. Keep the picture tube away from the body while handling.

3. When replacing chassis in the cabinet, ensure all the protective devices are put back in place, such as: barriers, non-metallic knobs, adjustments and compartment cover or shields, isolation resistor-capacitor, etc.

4. When service is required note the original lead locations and anchor points. Ensure all leads, especially in areas of high voltage, are routed/anchored in their correct locations when reassembling the receiver.

5. Always use the manufacturer's replacement component. Always replace original spacers and maintain lead lengths. Especially critical components which should not be replaced by other makers. Furthermore where a short circuit has occurred, replace those components that indicate evidence of overheating.

6. Before returning a serviced receiver to the customer, the service technician must throughly test the unit to be certain that it is completely safe to operate without danger of electrical shock, and be sure that no protective device built into the instrument by the manufacturer has become defective, or inadvertently damaged during servicing. Therefore, the following checks are recommended for the continued protection of customers and service technicians.

## INSULATION

Insulation resistance should not be less than 10M at 500V DC between the mains poles and any accessible metal parts.
Also, no flashover or breakdown should occur during the dielectric strength test applying 3kV AC or 4.25kV DC for two seconds between the main poles and accessible metal parts

## HIGH VOLTAGE

High voltage should always be kept at rated value of the chassis and no higher. Operating at higher voltage may cause a failure of the picture tube or high voltage supply and also, under certain circumstances could produce x-ray radiation moderately in eexcess of design levels. The high voltage must not, under any circumstances exceed 26 kV on the chassis.

## X-RAY RADIATION

TUBES: The primary source of x-ray radiation in this receiver is the picture tube. the tube utilised for the above mentioned function in this chassis is specially constructed to limit x-ray radiation for continued x-ray radiation protection, replace tube with the same type as the original BEKO approved type.

## PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in BEKO television receivers have special safety related characteristics. These characteristics are often not evident from visual inspection nor can the protection afforded by them necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified by marking with a ⚠ on the schematics and replacement parts list in this Service Manual.
The use of a substitute replacement component which does not have the same safety characteristics as the BEKO recommended replacement one, shown in the parts list in this Service Manual, may create electrical shock, fire, X-radiation, or other hazards.

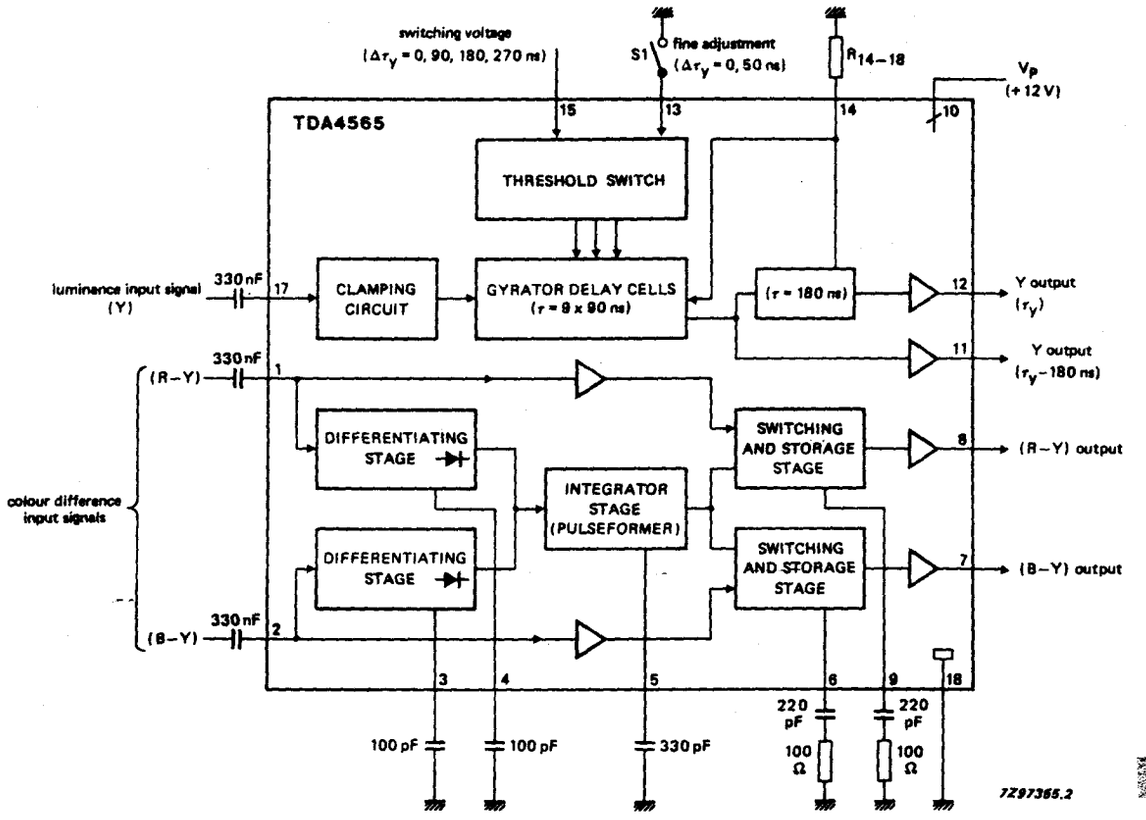
## TUBE DISCHARGE

The line output stage can develop voltages in excess of 25kV; if the E.H.T. cap is required to be removed, discharge the anode cap to chassis via a high value resistor, prior to its removal from the tube.

# TDA 4565 COLOUR TRANSIENT IMPROVEMENT CIRCUIT

## GENERAL DESCRIPTION

The TDA 4565 is a monolithic integrated circuit for coulour transient improvement (CTI) and luminance delay line in gyrator technique in colour television receivers.




## Features

- Colour transient improvement for colour difference signals (R-Y) and (B-Y) with transient detecting, store- and switching stages resulting in high transients of colour difference output signals.

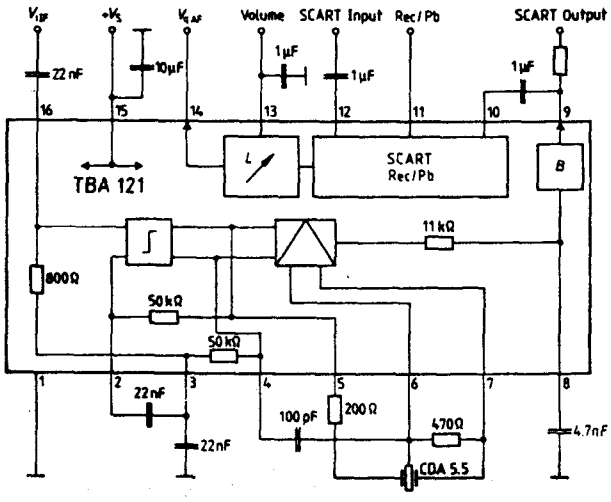
- A luminance -signal path (Y) which substitutes the conventional Y-delay coil with an integrated Y-delay line.

- Switchable delay time from 730 ns to 1000 ns in steps of 90 ns and additional fine adjustment of 50 ns

- Two Y output signals; one of 180 ns less delay

# TBA 121 FM Sound IF with SCART Switch and Volume Control

## Blok Diagram




## Features

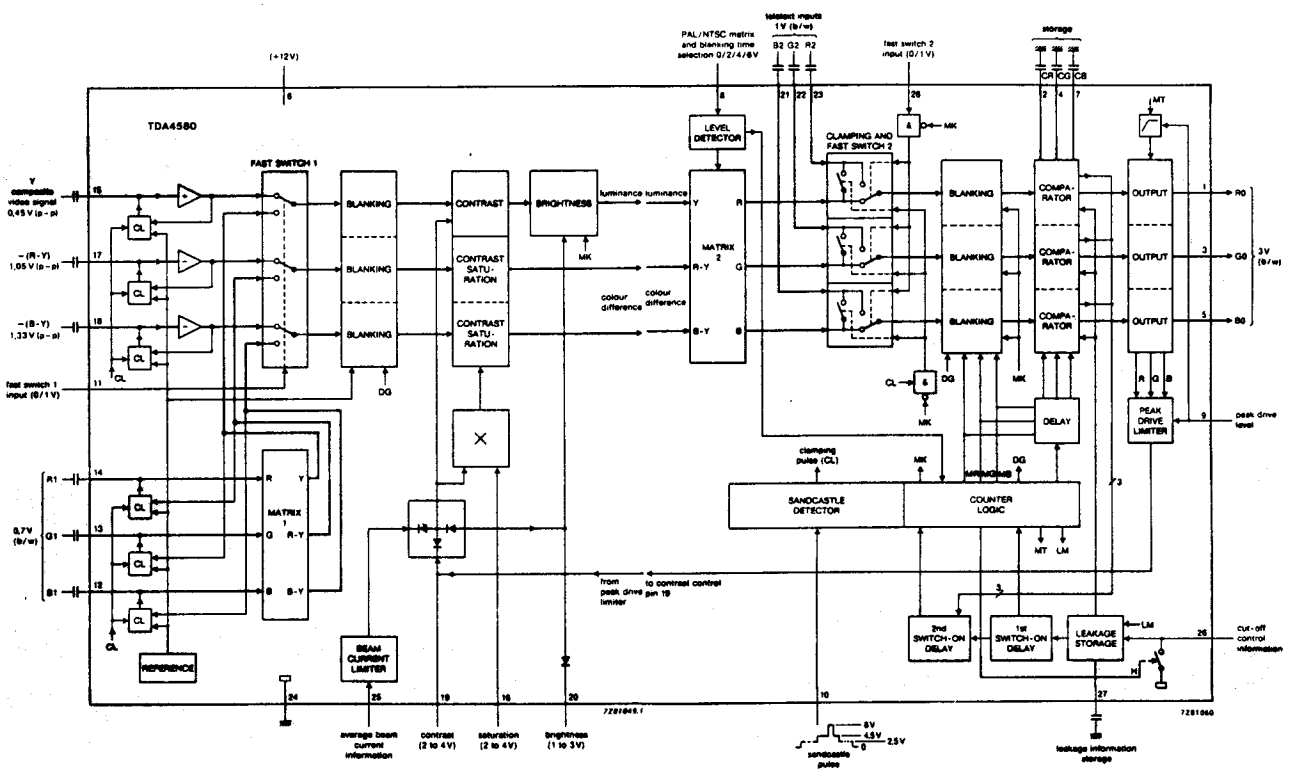
- Outstanding limiting qualities
- Few external components
- Integrated deemphasis resistor
- Low harmonic distorsion factor

**PIN FUCTIONS**

| Pin No. | Function |
|---|---|
| 1. | Ground |
| 2. | Limiter amplifier operating point feedback |
| 3. | Limiter amplifier operating point feedback and low end |
| 4. | IF amplifier output (emitter follower) |
| 5. | IF amplifier output (emitter follower) |
| 6. | Demodulator input with high impedance input and internal 15 kΩ supply resistor |
| 7. | Demodulator input with high impedance input and internal 15 kΩ supply resistor |
| 8. | Connection for demphasis capacitor |
| 9. | AF output of the SCART interface |
| 10. | AF input 1 of the SCART interface (IF branch) |
| 11. | Rec/Pb switch input |
| 12. | AF input 2 of the SCART interface (SCART input) |
| 13. | Volume control |
| 14. | IF output (emitter follower) |
| 15. | Supply voltage |
| 16. | IF input |

In its FM section the device incorporates an eight,stage-balanced limiter amplifier followed by a coincidence demodulator. The AF section includes an analog switch for the SCART record/playback function and an analog volume control with AF output..

# TDA4580 VIDEO CONTROL COMBINATION CIRCUIT
## With automatic cut-off control

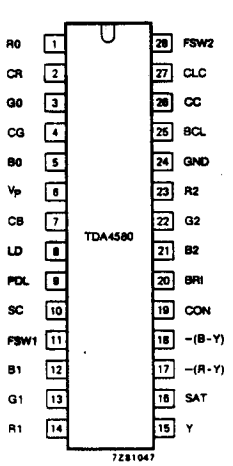



## GENERAL DESCRIPTION

The TDA4580 is a monolithic integrated circuit which performs video control functions in television receivers with a colour difference interface. For example it operates in conjunction the multistandard colour decoder TDA4555. The required input signals are: luminance and negative colour difference -(R-Y) and (B-Y), and a 3-level sandcastle pulse for control purposes. Analogue RGB signals can be inserted from two sources. One with full performance adjustment possibilities. RGB output signals are available for driving the video output stages. This circuit provides automatic cut-off control of the picture tube.

## Features

- Capacitive coupling of the colour difference, luminance and RGB input signals with black level clamping
- Two sets of analogue RGB inputs via fast switch 1 and fast switch 2
- First RGB inputs and fast switch 1 in accordance with peritelevision connector specification
- Saturation, contrast and brightness control acting on first RGB inputs.
- Brightness control acting on second RGB inputs.
- Equal black levels for television and inserted signals.
- Clamping, horizontal and vertical blanking, and timing of automatic cut-off, controlled by a 3-level sandcastle pulse
- Automatic cut-off control with compensation for leakage current of the picture tube
- Measuring pulses of cut-off control start immediately after end of vertical part of sandcastle pulse
- Three selectable blanking intervals for PAL, SECAM and NTSC/PAL-M
- Two switch-on delays for run-in without discolouration
- Adjustable peak drive limiter
- Average beam current limiter
- G-Y and RGB matrix coefficients selectable for PAL/SECAM and NTSC (correction for FCC primaries)
- Bandwith 10 MHz (typ.)
- Emitter-follower outputs for driving the RGB output stages

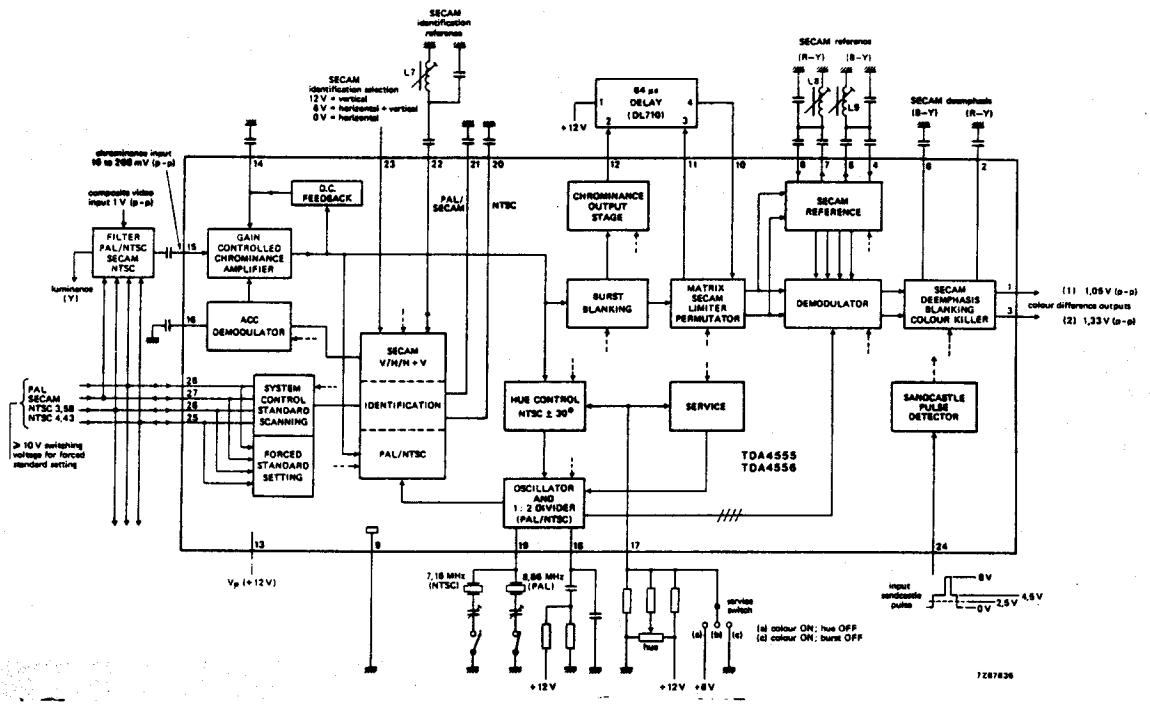



**PINNING**

| pin no. | mnemonic | description |
|---|---|---|
| 1 | RO | Red output |
| 2 | CR | Red storage capacitor for cut-off control |
| 3 | GO | Green output |
| 4 | CG | Green stroge capacitor for cut-off control |
| 5 | BO | Blue output |
| 6 | Vp | Positive supply voltage |
| 7 | CB | Blue storage capacitor for cut-off control |
| 8 | LD | PAL/NTSC matrix and blanking time level detector input |
| 9 | PDL | Peak drive limiting input |
| 10 | SC | Sandcastle pulse input |
| 11 | FSW1 | Fast switch 1 for Y, CD and RGB inputs |
| 12 | B1 | Blue input (external signal) |
| 13 | G1 | Green input (external signal) |
| 14 | R1 | Red input (external signal) |
| 15 | Y | Luminance input |
| 16 | SAT | Saturation control input |
| 17 | -(R-Y) | Colour difference input-(R-Y) |
| 18 | -(B-Y) | Colour difference input-(B-Y) |
| 19 | CON | Contrast control input |
| 20 | BRI | Brightness control input |
| 21 | B2 | Teletext blue input |
| 22 | G2 | Teletext green input |
| 23 | R2 | Teletext red input |
| 24 | GND | Ground |
| 25 | BCL | Average beam current limiting input |
| 26 | CC | Automatic cut-off control input |
| 27 | CLC | Storage capacitor for leakage current |
| 28 | FSW2 | Fast switch 2 for teletext inputs |

## TDA 4555 MULTISTANDART DECODER

The TDA4555 is a monolithic integrated multistandard colour decoder for PAL, SECAM, NTSC 3.58 MHz and NTSC 4.43 MHz standard.




## FEATURES

**Crominance part** includes gain controlled chrominance amplifier and ACC rectifier circuits for PAL, SECAM and NTSC. Crominance output stage drives the 64 µs glass delay line (Pal, Secam). There are SECAM permutater and limited stages for direct and delayed SECAM SIGNAL.

**Demodulator part** PAL switch, internal PAL matrix, de-emphasis, two guadrate demodulators with external reference tuned circuits (SECAM). Flyback blanking incorporated in the two synchonous demodulators (PAL, NTSC), and residual carrier is filtered internaly.

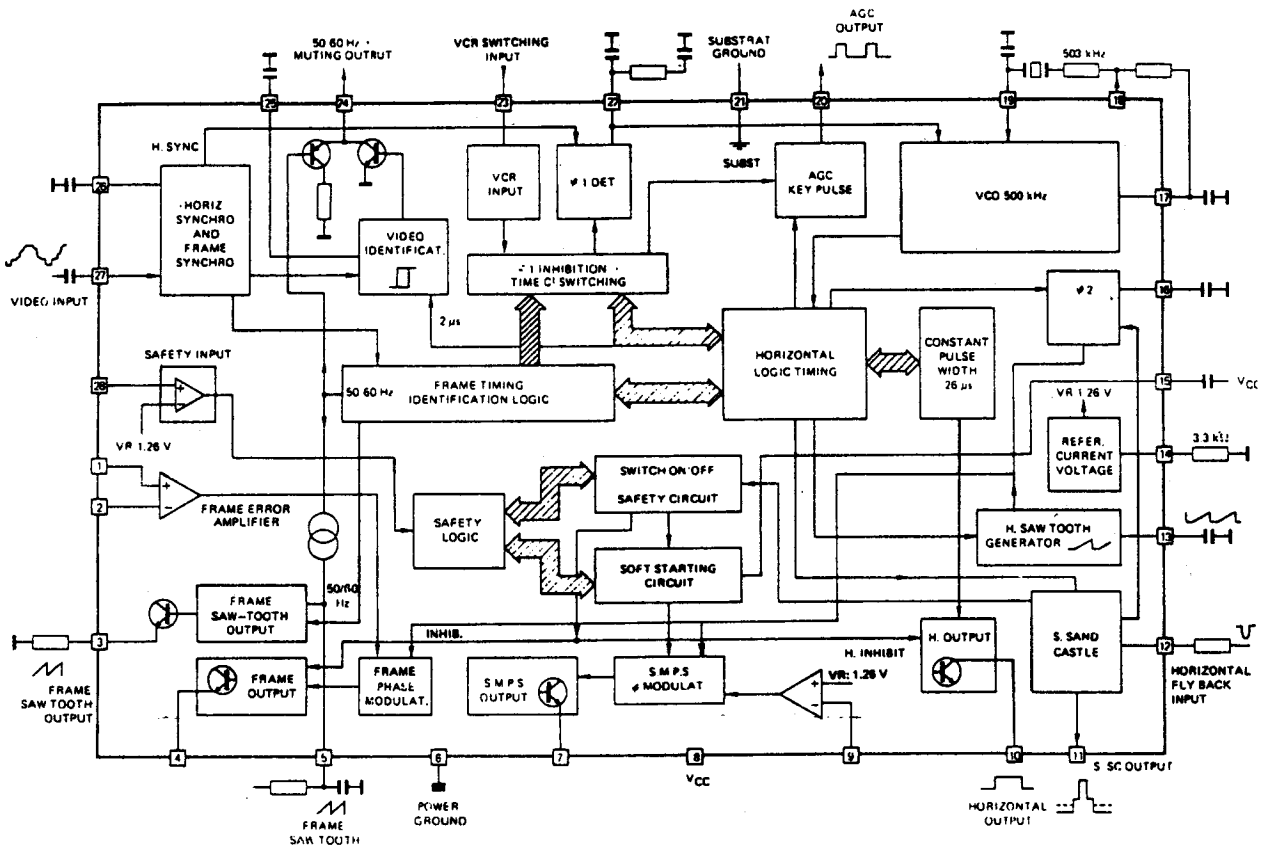
**Identification part** performs automatic standard recognition by sequential inquiry, delay for colour-on and scanning-on. SECAM identification is reliable by PAL priority circuit. Forced switch-on is possible. IC includes two identification circuit for PAL/SECAM (H/2) and NTSC and PAL/SECAM flip-flop. Crystal oscillator includes divider stages and PLL circuity (PAL, NTSC) for double colour subcarrier frequency.

# TEA2029 C COLOUR TV SCANNING AND POWER SUPPLY PROCESSOR

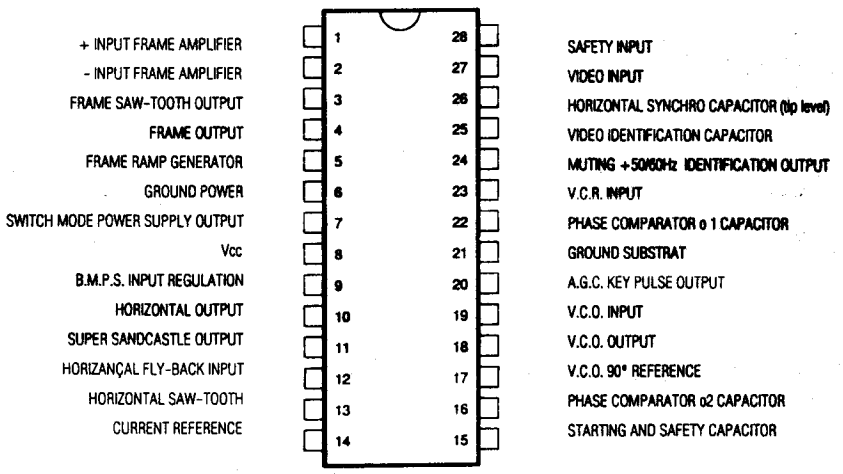
## DESCRIPTION

The TEA2029 is a complete (horizontal and vertical) deflection processor with secondary to primary SMPS control for color TV sets.

## BLOCK DIAGRAM




## PIN CONNECTIONS



## GENERAL DESCRIPTION

This integrated circuit uses $I^2L$ bipolar technology and combines analog signal processing with digital processing.
Timing signals are obtained from a voltage-controlled oscillator (VCO) operating at 500KHz by means of a cheap ceramic resonator. This avoids the frequency adjustment normally required with line and frame oscillators.
A chain of dividers and appropriate logic circuitry produce very accurately defined sampling pulses and the necessary timing signals.
The principal functions implemented are:

- Horizontal scanning processor.
- Frame scanning processor. Two applications are possible:

**- D Class** Power stage using an external thyristor.
**- B Class** Power stage using an external power amplifier with fly-back generator such as the TDA8170

- Secondary switch mode power regulation. The SMPS output synchronize a primary I.C. (TEA2164 or TEA2260/61) at the mains part. This concept allows ACTIVE STANDBY facilities.
- Dual phase-locked loop horizontal scanning.
- High performance frame and line synchronization with interlacing control.
- Video identification circuit.
- Super sandcastle.
- AGC key pulse output..
- Automatic 50-60Hz standard identification.
- VCR input for PLL time constant and frame synchro switching.
- Frame saw-tooth generator and phase modulator.
- Switching mode regulated power supply, comprising error amplifier and phase modulator.
- Security circuit and start-up processor.
- 500KHz VCO.

The circuit is supplied in a 28 pin DIP case.
Vcc = 12V.

## SYNCHRONIZATION SEPARATOR

**Line synchronization separator** is clamped to black level of input video signal with synchronization pulse bottom level measurement.
The synchronization pulses are divided centrally between the black level and the synchronization pulse bottom level, to improve performance on video signals in noise conditions.

## FRAME SYNCHRONIZATION

**Frame synchronization** is fully integrated (no external capacitor required).
The frame timing identification logic permits automatic adaptation to 50 - 60 Hz standard or non-interlaced video.
An automatic synchronization window width system provides:

- fast frame capture (6.7 ms wide window).
- good noise immunity (0.4ms narrow window).

The internal generator starts the discharge of the saw-toth generator capacitor so that it is not disturbed by line fly back effects.
Thanks to the logic control, the beginning of the charge phase does not depend on any disturbing effect of the line fly-back.
A 32µs timing is automatically applied on standardized transmissions, for perfect interlacing.
In VCR mode, the discharge time is controlled by an internal monostable independent of the line frequency and gives a direct frame synchronization.

## HORİZONTAL SCANNING

The horizontal scanning frequency is obtained from the 500kHz VCO.
The circuit uses two phase-locked loops (PLL):
the first one controls the frequency, the second one controls the relative phase of the synchronization and line fly-back signals.

The frequency PLL has two switched time constants to provide:
- capture with a short time constant.
- good noise immunity after capture with a long time constant.

The output pulse has a constant duration of 26µs, independent of Vcc and any delay in switching off the scanning transistor.

## VIDEO IDENTIFICATION

The horizontal synchronization signal is sampled by a 2µs pulse within the synchronization pulse. The signal is integrated by an external capacitor.
The identification function provides three different levels:
- 0V : no video identification
- 6V : 60Hz video identification
- 12V : 50Hz video identification

This information may be used for timing research in the case of frequency or voltage synthetizer type receivers, and for audio muting.

**SUPER SANDCASTLE** with 3 levels : burst, line flyback, frame blanking.
In the event of vertical scanning failure, the frame blanking level goes high to protect the tube.
Frame blanking time (start with reset of Frame divider) is 24 lines.

## VCR INPUT

This provides for continuos use of the short time constant of the first phase-locked loop (frequency).
In VCR mode, the frame synchronization window widens out to search window and there is no delay of frame fly-back (direct synchronization).

## FRAME SCANNING

**FRAME SAW-TOOTH GENERATOR.** The current to charge the capacitor is automatically switched to 60Hz operation to maintain constant amplitude.
Frame phase modulator (With two differential inputs). The output signal is a pulse at the line frequency, pulse width modulated by the voltage at the differential pre-amplifier input.
This signal is used to control a thyristor which provides the scanning current to the yoke. The sawtooth output is a low impedance, however, and can therefore be used in class B operation with a power amplifier circuit.

## SWITCH MODE POWER SUPPLY (SMPS) SECONDARY TO PRIMARY REGULATION

This power supply uses a differential error amplifier with an internal reference voltage of 1.26 and a phase modulator operating at the line frequency. The power transistor is turned off by the falling edge of the horizontal saw-tooth.

The "soft start" device imposes a very small conduction angle on starting up, this angle progressively increases to its nominal regulation value.

The maximum conduction angle may be monitored by forcing a voltage on pin 15. This pin may also be used for current limitation.

## SECURITY CIRCUIT AND START UP PROCESSOR

When the security input (pin 28) is at a voltage exceeding 1.26V the three outputs are simultaneously cut off until this voltage drops below the 1.26 V thresholdu again. In this case the switch mode power supply is restarted by the "soft start" system.

If this cycle is repeated three times, the three outputs are cut off definitively. To reset the safety logic circuits, Vcc must be zero volt.

This circuit eliminates the risk to switch OFF the TV receiver in the event of a flash affecting the tube.

# TELETEXT MODULE

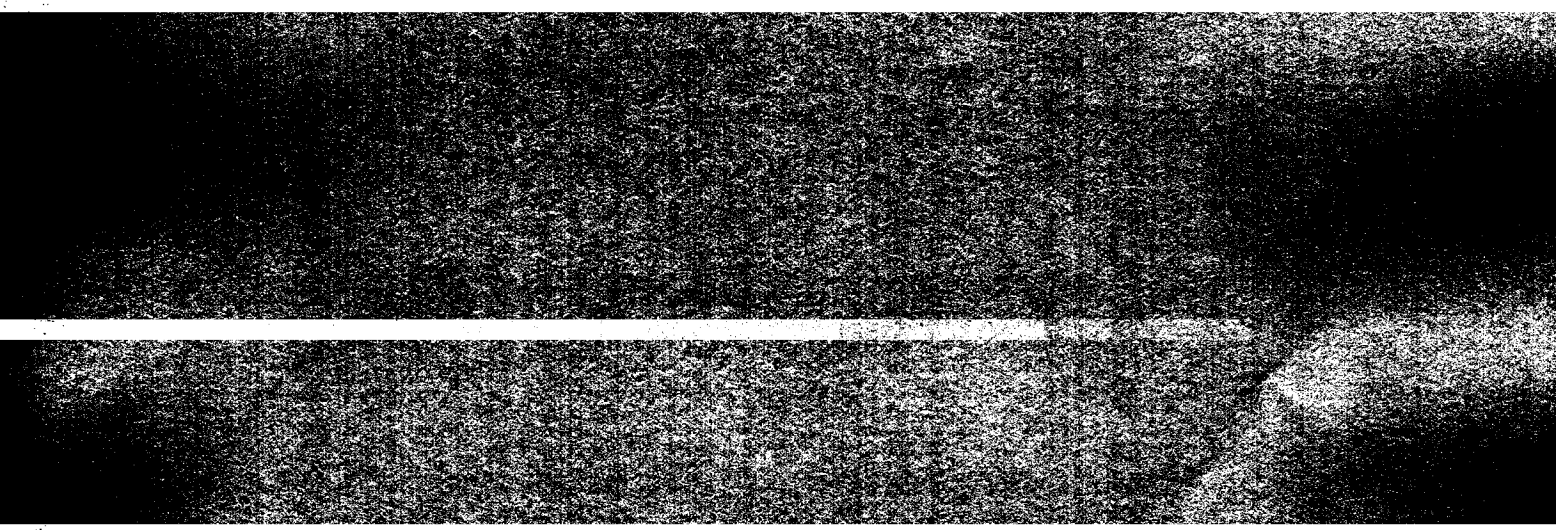
## 1.3.5 TELETEXT DATA SLICER SDA 5231

The SDA 5231 data slicer is used in the teletext decoding section to seperate the teletext data signal from the CVBS signal. Information consists of eight bits, where the most significant bit is a parity bit, followed by seven data bits. The teletext signal amplitude is reduced to 50 percent of it's incoming value by the SDA 5231 to reduce the possibility of interference from other sources. A phase shifting circuit together with a crystal oscillator regenerate the data synchronous clock. So clock and data signal can be supplied to the teletext decoder device.
A synchronous separator generates line and field sync pulses. The line sync signal is used to control an on-chip 6MHz oscillator which passes on the clock signal to the teletext decoder.

After attaing line frequency (15,625kHz), the signal is transmitted to the slicer. Here a phase comparator synchronizes the, 5.5MHz oscillator rigidly to the video signal so that, if video signal quality is sufficient, fading in a text into a TV picture (e.g.subtitles) is possible synchronous to CVBS signal.
The SDA 5231 is manufactured in bipolar technology and housed in a DIP 28 case.

## 1.3.6 THE TELETEXT PROCESSOR SDA 5243

The teletext processor SDA 5243 and IIC bus controlled devices to process all funtions which are necessary to use the teletext service of broadcasters, only in 6 foreign languages as English, German, French, Türkish, Spanish, Italien.
Serial teletext data is received from the SDA 5231 data slicer. Four independent acquisition circuits are responsible for selecting the requested data. After acquisition the data is loaded via a memory interface to an external RAM. Each received page occupies 1kByte of ram (2kByte if ghost rows are received).
The external RAM is read out cyclically and the data is processed in a character generator into R-, G-, B- information. Further a blanking signal, a contrast reduction signal and a Y-signal to control a black and white monitor are generated. Via the IIC bus interface 12 registers can be loaded by the microcontroller and one register can be read and written too.
The SDA 5243 is mounted in a 40 pin DIP case.



# DISASSEMBLY INSTRUCTONS
## (See also Exploded Views)

### BACK COVER REMOVAL
### (For 20"-21" Models)
1. Remove 2 csrews at the bottom of the back cover
2. Push in 4 side locks by pushing with a screw driver and pull back the cover carefully. Taking care not to pull the speaker cable.
3. Disconnect the speaker cable from the chassis and take out the power cord from the cable way at the bottom of the back cover. Figure 1

### (FOR 14" - 15" Models)
1. Remove 4 screws holding the back cover.
2. Remove the screw fixing the power cord holder to the back cover.
3. Pull back the cover carefully, taking care not to pull the speaker cable.
4. Disconnect the speakercable form the chassis.

NOTE!
When reassembling the back cover, take care to slide the main chassis board into the guideways located on the back cover on both sides. Figure 2

### SPEAKER ASSEMBLY REMOVAL (For 20"-21" Models)
1. Remove the 2 csrews fixing the speaker assembly to the back cover.
2. Release the four locks and push the assembly out.
3. Remove the 4 screws holding the speakers on the speaker assembly. Figure 4

### SPEAKER REASSEMBLY (For 14"-15" Models)
1. Place the speaker on the speaker assembly; the speaker terminals should be placed towards the front of the TV set.
2. Slide the locks on the assembly through the holes of the back cover until hearing a "click" sound which means that the assembly has fitted in place.
3. Attach the screws (2 pcs) fixing the speaker assembly to the back cover. Figure 3

### MAIN CHASSIS REMOVAL (FOR 20"-21" Models)
1. Open two guide locks on both sides of the chassis and pull the chassis out.
2. Take the cables, connected to the power switch, out from the chassis frame.
3. Pull the chassis back carefully.

### (For 14"-15" Models)

1. Pull the chassis back carefully.

### CPT REMOVAL
1. Disconnect power (ST01, 02), degaussing (ST101) and control unit cables (ST03,04) from the chassis.
2. Discharge the tube and disconnect the E.H.T. cap as told in Safety Instructions.
3. Disconnect the tube earthing cable coming from the CPT board.
4. Disconnect the ST802 connector on the chassis, and cable ties holding the cables of ST802 and ST801.
5. Disconnect the CPT board from the neck of the tube, taking care not to damage the tube pins.
6. Place the front cover on soft material so as not to mar the front surface or damage the controls.
7. Remove 4 screws securing the picture tube brackets to the front cover.
8. Carefully separate the CPT from the front cover.

### CAUTION
Great care must be taken when handling the picture tube.

Always lift the picture tube by holding it firmly arround the face plate. DO NOT LIFT THE BY ITS NECK.
The picture tube must not be scratched or subjected to excessive pressure.

# NICAM MODULE

## BRIEF DISCRIPTION OF SAA 7280

The SAA 7280 is a CMOS integrated circuit that fully conforms to the EBU NICAM 728 specification. This device takes as input a NICAM 728 encoded signal data stream from the DQPSK demodulator, then performs the descrambling, de-interleaving and reformatting functions required to recover the original sound samples. The SAA 7280 contains an I²C bus transceiver enabling microcomputer control of the IC, and has automatic decoding and output configuration depending upon transmission:

— digital stereo
— digital mono+data
— two independent mono signals

Other features include: on board RAM for de-interleaving and 10 to 14 bit word expansion, 7 sample interpolator for erroneous samples, selectable 3x digital oversampling filter, and I²S sound bus output format. The on-chip 3x oversampling filter reduces the components needed for external analogue filtering.

## D/A conversion - TDA 1543

The TDA 1543 is a monolithic integrated dual 16-bit digital-to-analogue converter (DAC), which was originally developed for compact disk players. It combines ease and economy of application with good digital audio performance levels. The TDA 1543 takes in digital sound data in I²S format from the decoder and provides analogue left and right channel audio outputs. There is no requirement for external deglitcher circuitry due to fast settling output current, and few external components are required. A resistor, is used to set an output current bias to optimally bias the output operational amplifiers.

## AUDIO OUTPUT STAGE

The audio output stage converts the current source outputs of theTDA 1543 DAC into an audio output voltage on connectors X2 and X3 for power amplification. The output stage performs the following two functions:

— De-emphasis according to J-17 recommendation.
— Low pass filtering to remove sampling images from the 3X oversampling digital filter.

Two dual operational amplifiers (NE 5532) are included (one for each channel) on the application board to perform the above functions. One of the amplifiers in each package is used to perform the de-emphasis and first order low pass filtering. The second amplifier is used to realise a Sallen and Key 2nd order low pass filter. The overall response is a 3rd order Chebyshev low pass filter with a ripple bandwidth of 15KHz (ripple 0.25dB).

**FM-MONO I-STANDARD**

| TV-Transmitter-Mode | Display on Screen | Remote Control |
|---|---|---|
| mono | | |
| all modes | Mono | AF-Mode<br>(force mono) |

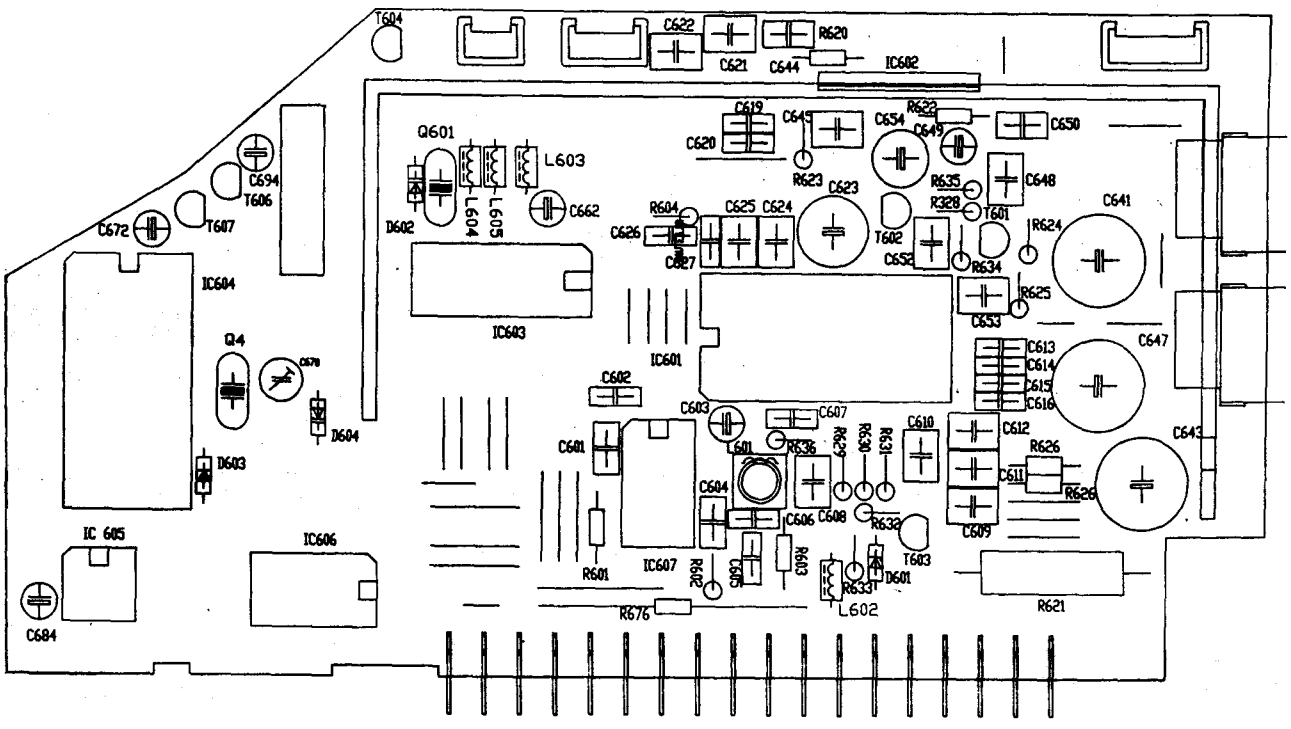
**NICAM I-STANDARD**

| TV-Transmitter-Mode | Display on Screen | Remote Control |
|---|---|---|
| Mono | NICAM | |
| dual | NICAM Dual A<br>NICAM Dual B | AF - Mode |
| stereo | NICAM Stereo | |
| all modes | Mono | AF - Mode (*)<br>(force mono) |

(*) In the mode force-mono the status NICAM is changing to FM-Sound and the display on screen NICAM will flash.

When the FM-Signal is not carrying the same sound program as the NICAM stereo or mono signal the display on screen is (NICAM) and the FM-Sound is priority.

NICAM MODULE PATTERN DRAWING

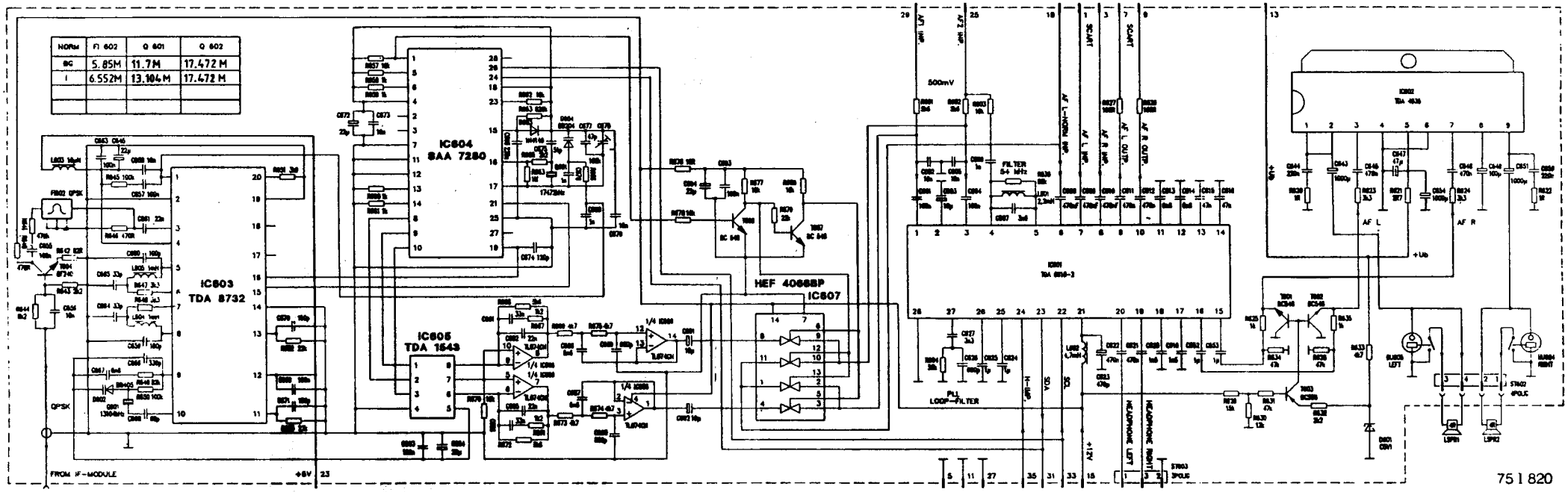


## STEREO AF AND NICAM MODULE WITH POWER AMPLIFIER

(Not used when stereo AF module with Decoder is available)

NICAM - DECODER

STEREO - DECODER AND POWER AMPLIFIER

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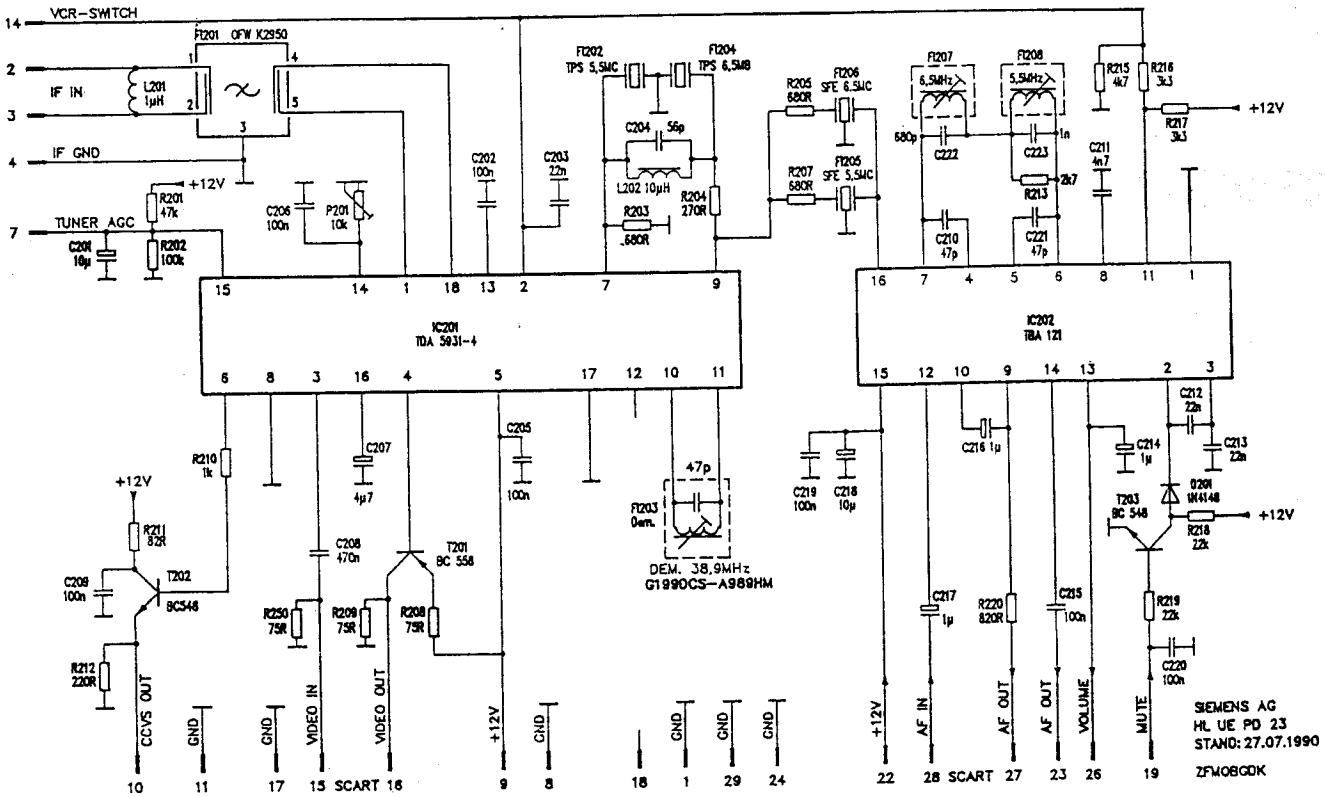
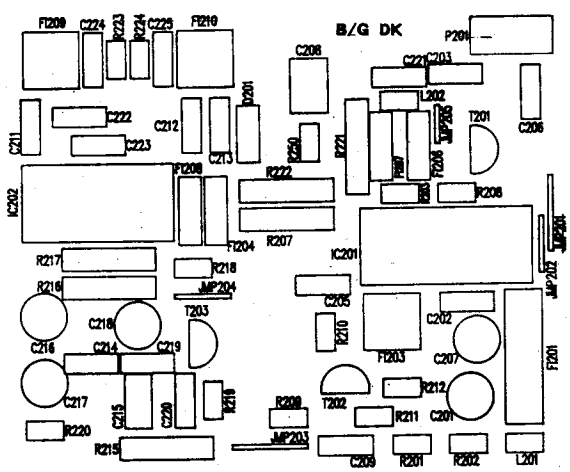
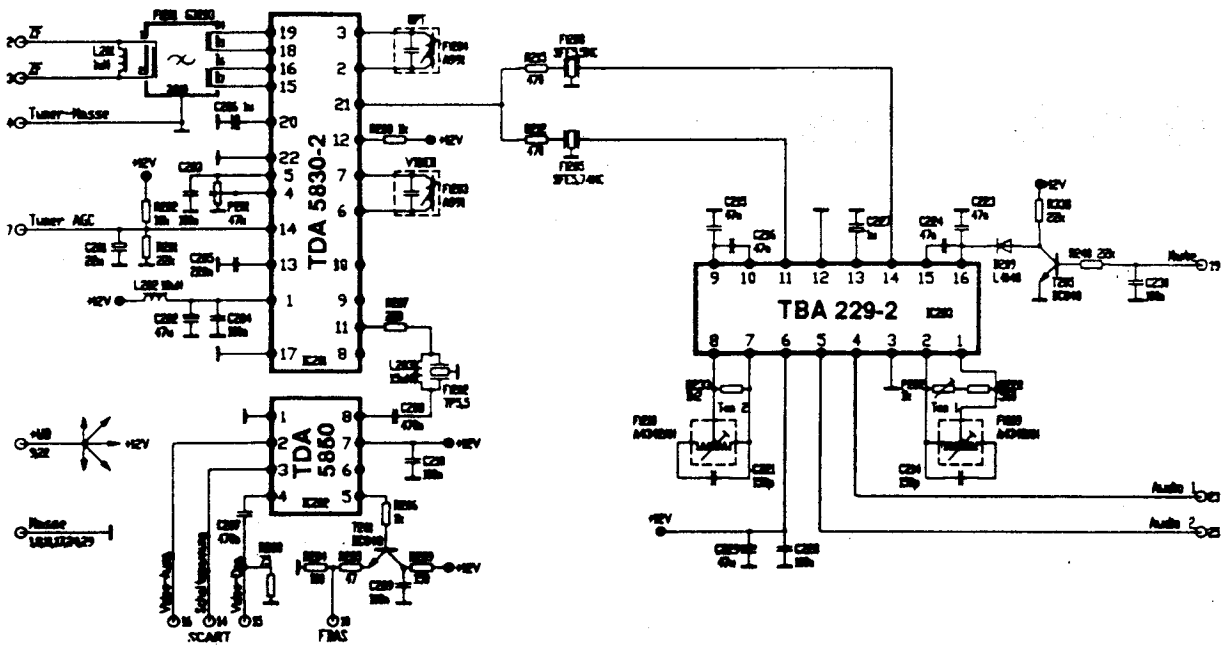
# MONO IF MODULE BG/DK



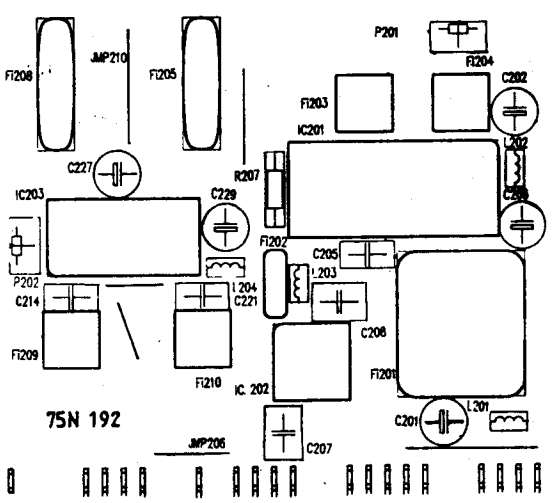

# MONO IF MODULE PATTERN DRAWING



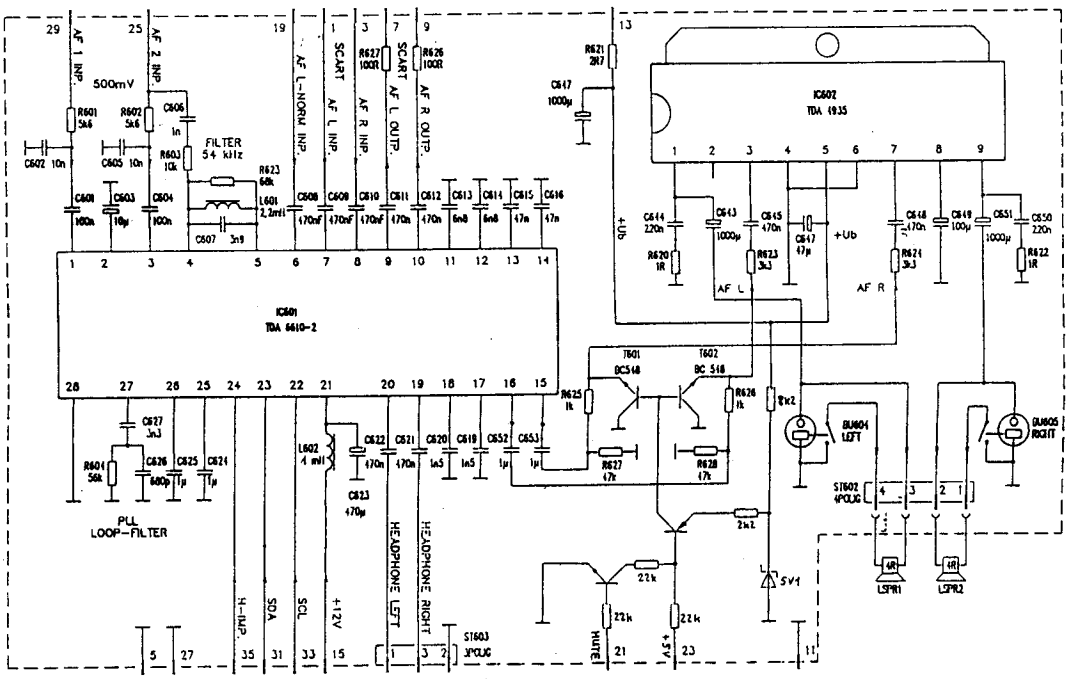
## STEREO IF MODULE

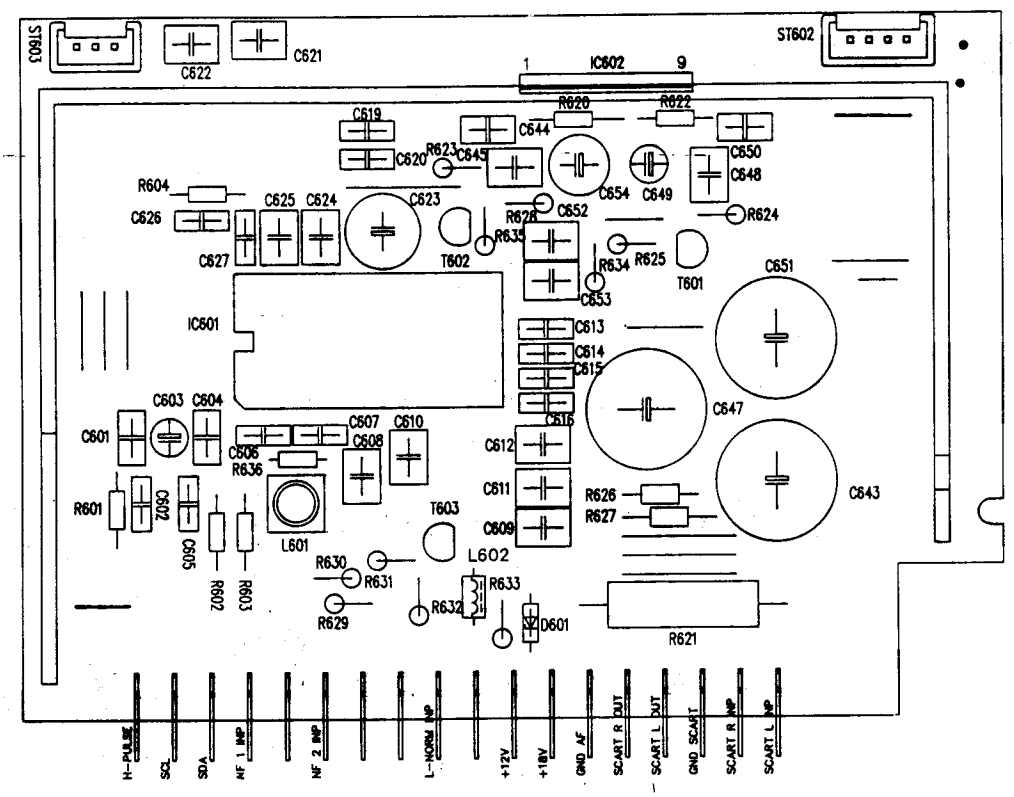



## STEREO IF MODULE
## PATTERN DRAWING



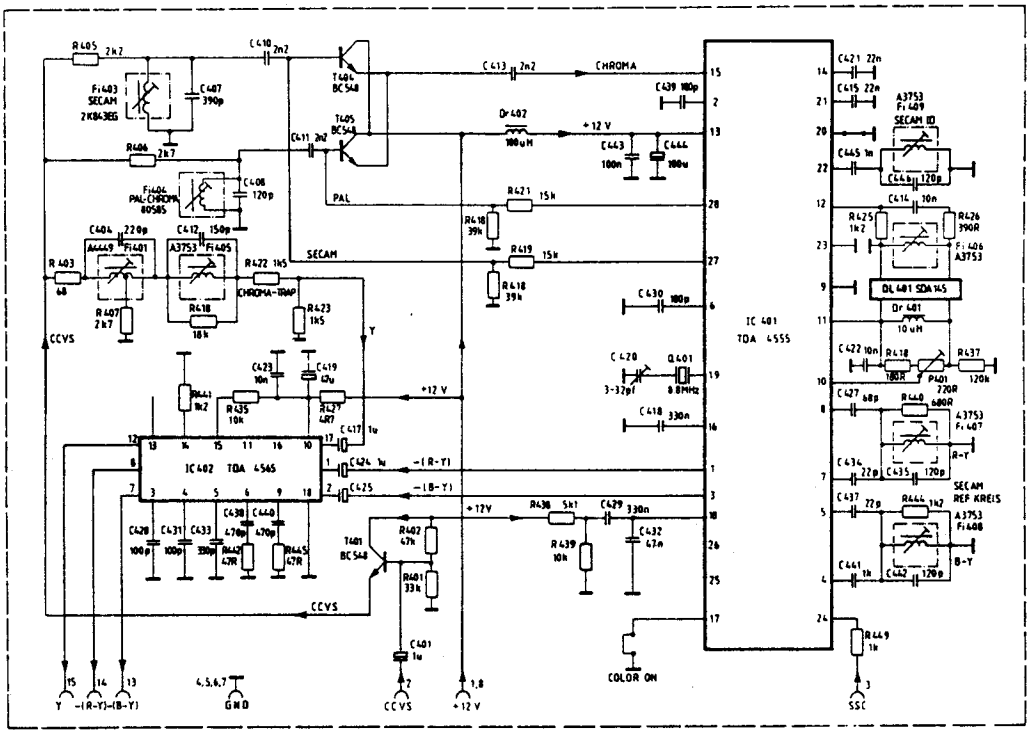
# STEREO AF MODULE WITH DECODER AND POWER AMPLIFIER



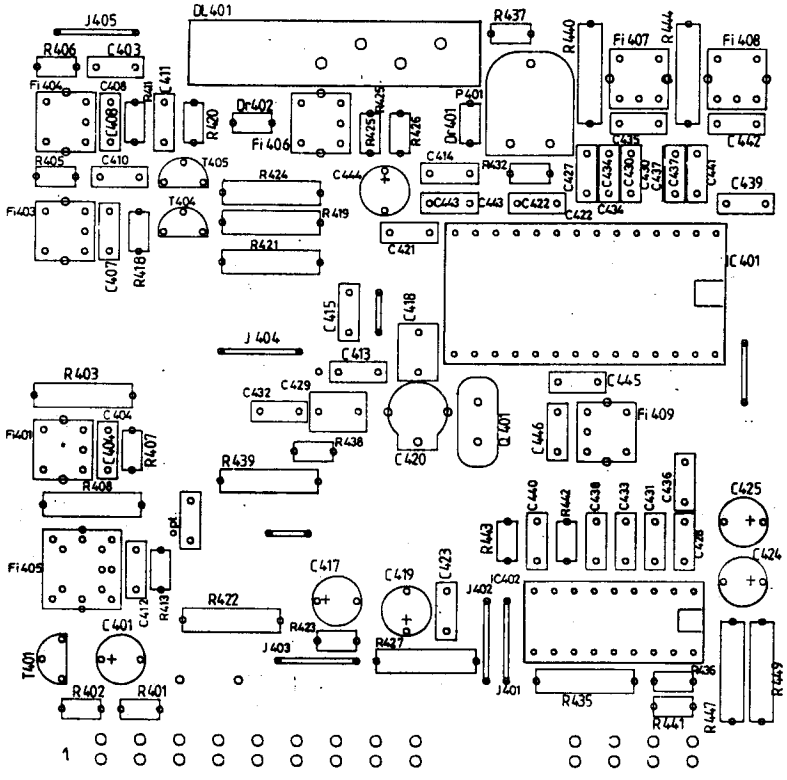




# STEREO DECODER PATTERN DRAWING

## PAL/SECAM DECODER WITH CTI

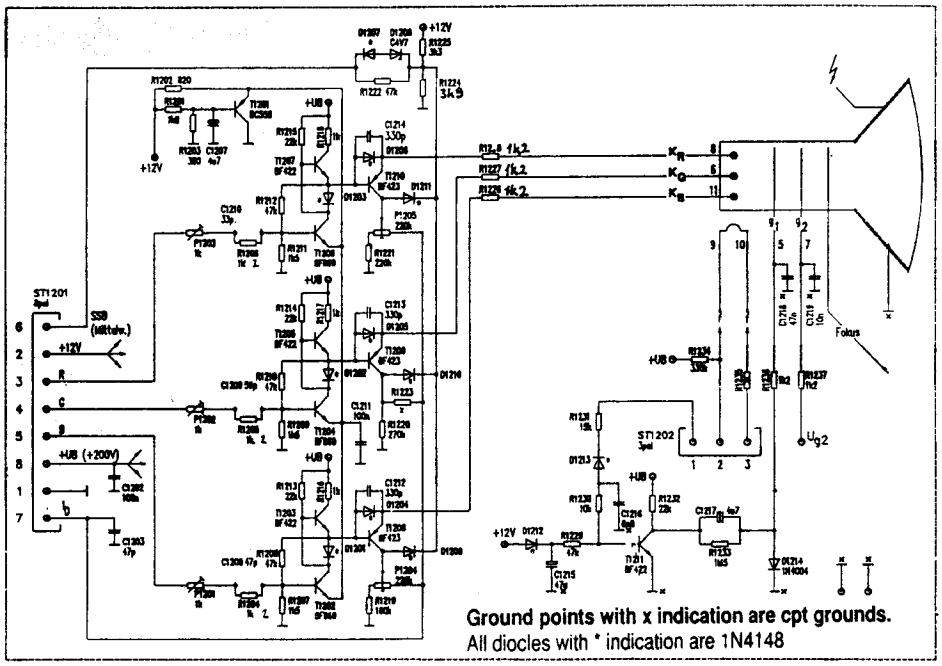



## PAL/SECAM MODULE PATTERN DRAWING



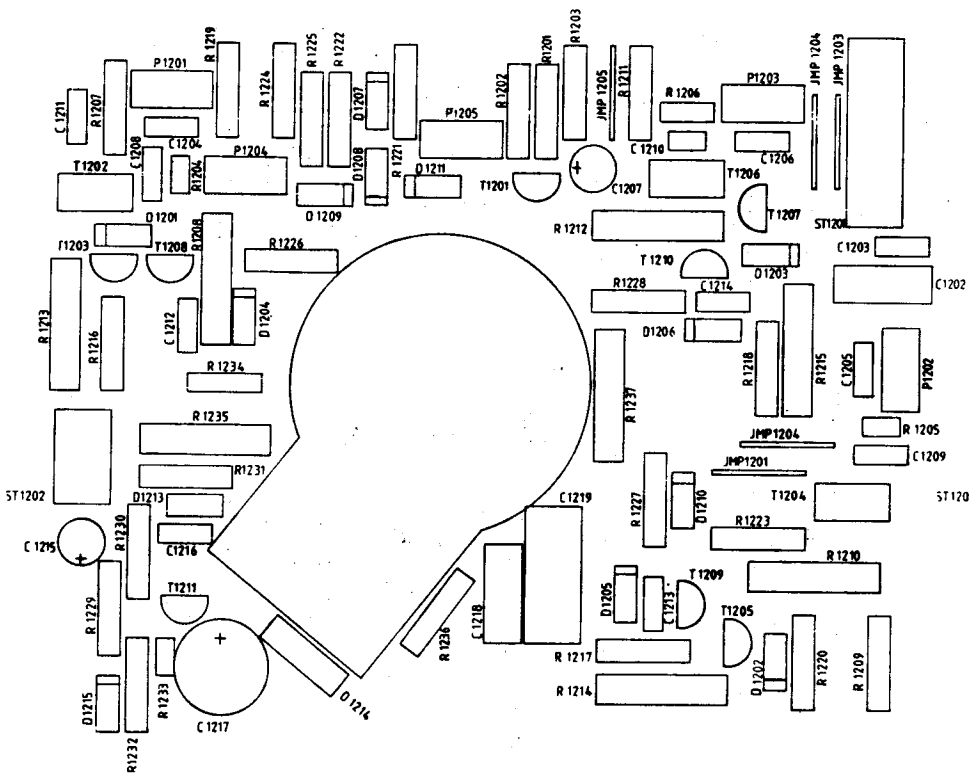

**PAL/SECAM**

# CRT MODULE



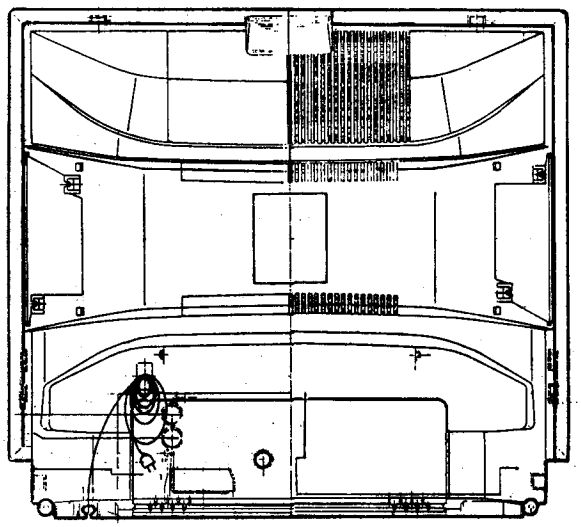

Subject to change without notice

# CRT MODULE PATTERN DRAWING



## DISASSEMBLY INTRUCTIONS

20"-21" Models



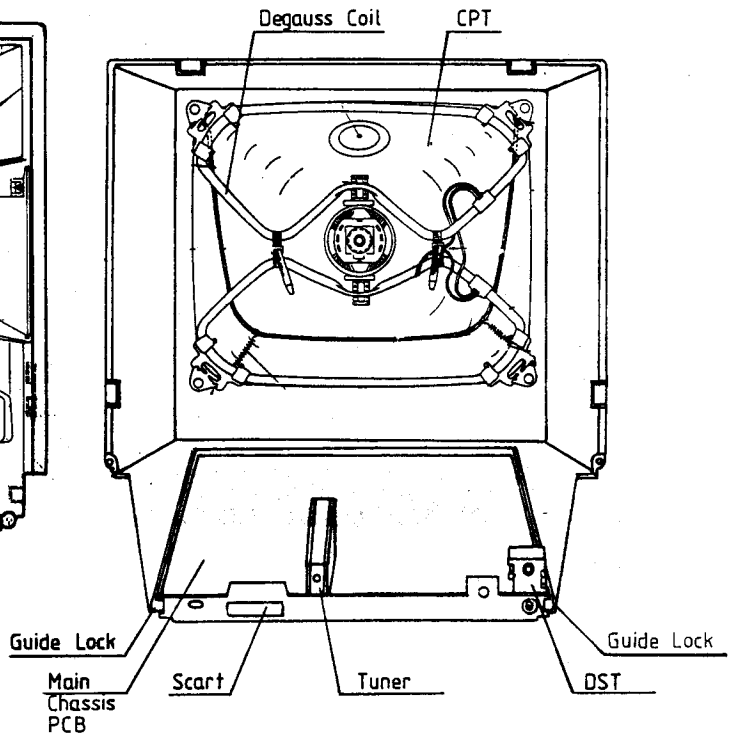
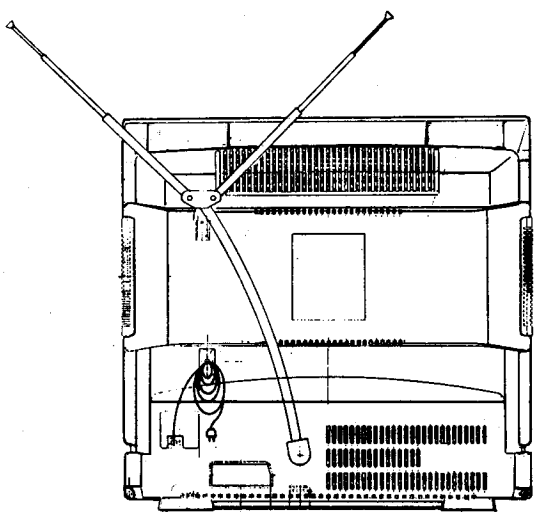



Figure 1

14"-15" Models



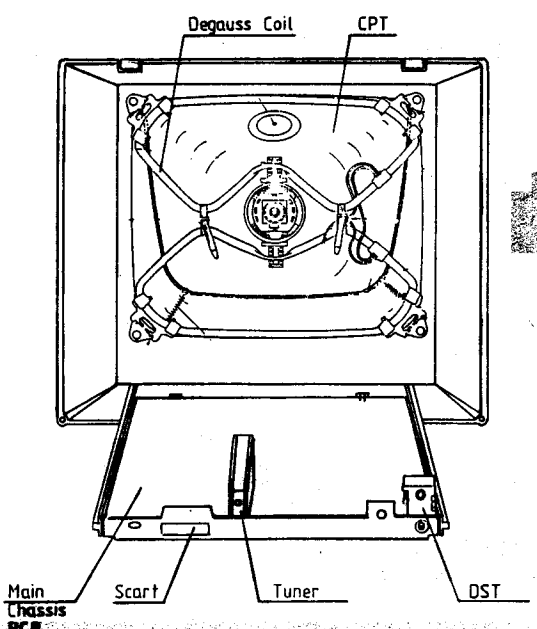



Figure 2

# SERVICE ADJUSTMENTS

## INTERMEDIATE FREQUENCY BOARD ADJUSTMENT AND CONTROL:

1— Apply 12V DC to 9th and 22nd pins of IF board.

2— Apply 38.5 MHz signal modulated with video signal (step or 2T) and 1kHz sound signal to 2nd or 3rd pins of IF board.

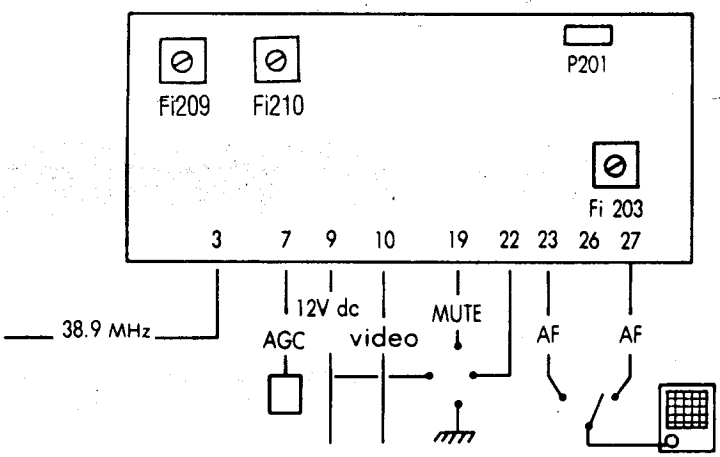
3— After connecting 7th pin of IF board to a voltmeter, see the AGC output change between 0 and 7.5V by adjusting P201 clockwise or counter clockwise. Leave it at its maximum level.

4— Adjust F 1203 until obtaining the wave form in Figure 8.
— Apply a voltage of changing between 0.3V and 4.6V DC to 26th pin o the IF board and see the. wave shape in Figure 8 from the 27 th pin of the board.

5— After grounding 19th pin of the board, see the muting on oscilloscope.

6— Apply 38.9 MHz signal modulated with video signal and 1kHz (6.5 MHz carrier) to pin 3. Adjust Fi209 for optinum waveform on pin 23 or 27 (standard D/K)

7— Apply 38.9 MHz signal modulated with video signal and 1kHz (5.5 MHz carrier) to pin 3. Adjust Fi210 for optimum waveform on pin 23 or 27. (Standard B/G)



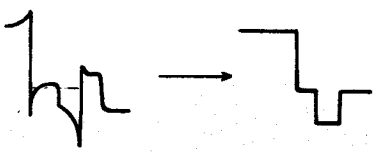



Figure 8

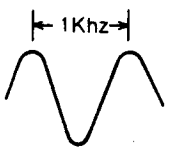



Figure 9

## SUPPLY VOLTAGE ADJUSTMENT:

1— While all controls are set to minimum, P101 is adjusted, so that the voltage difference between ground and R805 or D109 is 125 V DC+1V. (148 VDC + 1V for 110° Sets)

2— After P501 is adjusted to medium position, screen potentiometer on DST is adjusted until snowy picture is just obtained. Depress the NORMAL button on the Remote Control to optain the average contrast, brightness and colour settings.

3— Using a Philips pattern generator or other suitable signal, adjust P701 (horizontal adjustment) and P703 (vertical adjustment) to correctly position the picture. Adjust vertical amplitude with P702 and horizontal amplitude with L901.

## AGC ADJUSTMENT:

Input a color test pattern, the signal input voltage should be 1.5mV=64 dBuV+2dBuV, AGC voltage is observed. While adjusting P201 on IF board by rotating it clockwise, see the increase in DC level. After obtaining maximum DC value approximately at 8V, adjust P201 until DC level drops IV and becomes approximately 7Vdc.

## SCREEN ADJUSTMENT:

All potentiometers, on CRT PCB are adjusted to their medium positions. Additionally P501 on main board must also be at medium position. Contrast, Brightness and screen potentiometer are set to minimum.
AV position is selected on TV.
The oscilloscope is connected to the highest test points (either 154, 155 or 156) on CRT.
P501 is adjusted till the wave shape in Figure 5 is obtained.
Screen potentiometer is adjusted, so that the "X" lenght is 135V (158 Vdc for 110° chassis) and check the same shape for other test points too. Figure 10

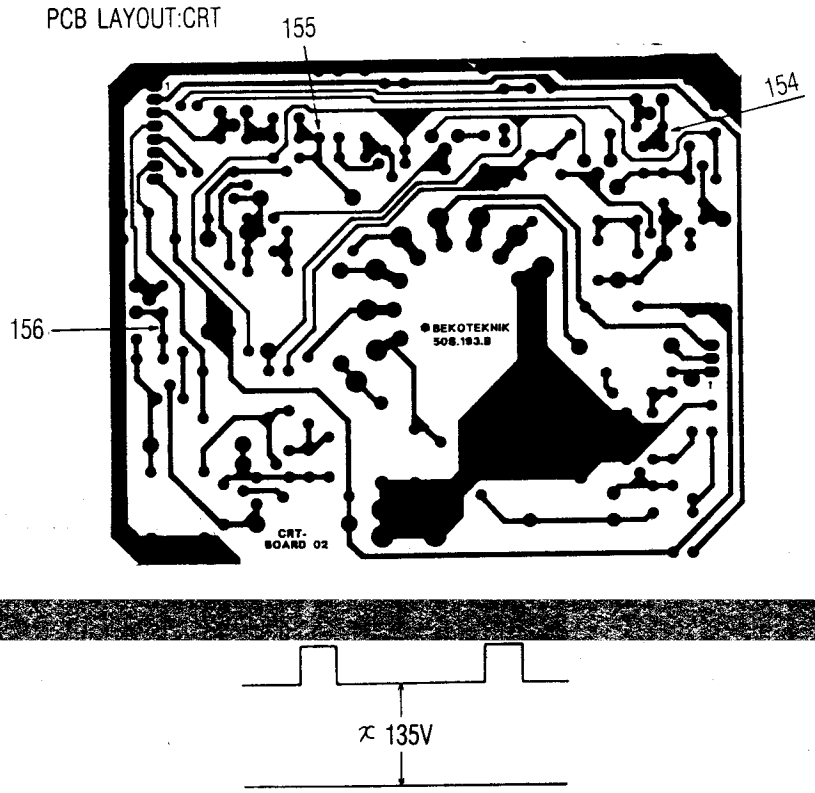



Figure 10

# WHITE BALANCE ADJUSTMENT

## a) HIGH LUMINANCE ADJUSTMENT

After selecting "White Pattern" colour minimized. Adjust the brightness and contrast to obtain a bright picture Y=60 ±5 nits (witch Minolta Colour Analyser) which corresponds % 80 of max. luminance level. P1203 (Red)), P1202 (Green) and P1201 (Blue) are adjusted to obtain best white level and coordinates which corresponds to 8600 deg K.

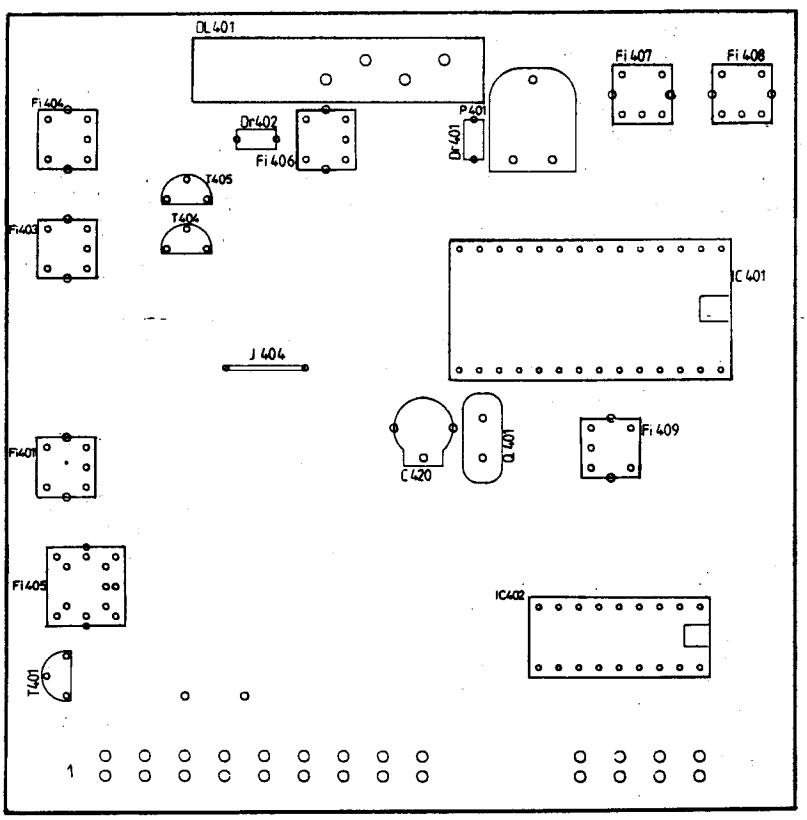
## b) LOW LUMINANCE ADJUSTMENT

Adjust the brightness and contrast to obtain Y=8 ± 3 nits a dark picture which corresponds appr. % 20 of max. luminance level, for low level white balance. P1205 (Red) and P1204 (Blue) are adjusted to obtain best white level which corresponds to 8600 deg. K.

8600 deg K =>X =287, Y=308

High and low level white balance adjustments have to be repeated once more, because of the inter action of high and low level white balance adjustments.

### PAL/SECAM BOARD ADJUSTMENT AND CONTROL




## PAL ADJUSTMENT:

1— FBAS-Color Bar signal-is applied to 2nd pin of the board.

2— While the signal on the emitter of T405 is observed on the oscilloscope, color carrier is adjusted to its maximum value with Fi404.

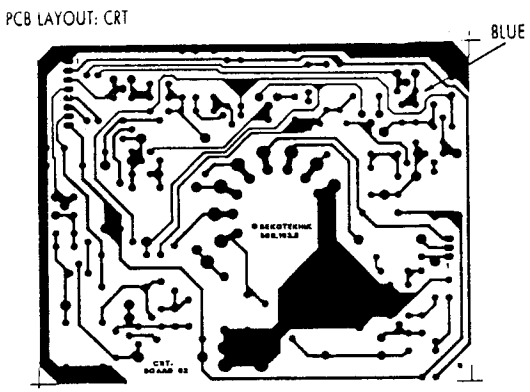
## REFERENCE OSCILLATOR ADJUSTMENT:

1- - The 17th pin of the TDA4555 is grounded.

2— Color flow on screen is minimized with C420.

## LUMINANCE ADJUSTMENT

1— Color carrier or 15th pin of the board is minimized with Fi401.



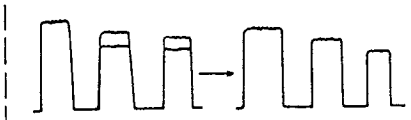



Figure 11

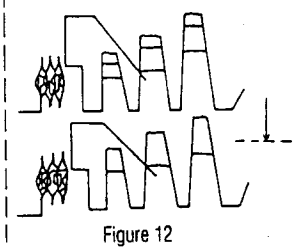


Figure 12

## PAL ADJUSTMENT:

1— Oscilloscope probe is connected to the end of "Blue" Potantiometer which is connected to R1204. And Fi 406 is adjusted as seen in Figure 11.

2— Philips DEM test signal is applied to the 2nd pin.

3— The gaps at speaks are adjusted so that they inserted as shown in Figure 12. Then check with 4.43 MHz section on Philips DEM pattern.

## SECAM ADJUSTMENT:

## CHROMA ADJUSTMENT:

1— Color bar signal is applied to the second pin at the board

2— The signal at the emitter of T404 is observed on oscilloscope. The peaks are adjusted with F1403-Bell filter-as shown in Figure 13.

## SECAM IDENTIFICATION ADJUSTMENT

1— A multimeter with high internal resistance (10M) is connected between 21st pin of TDA4555 and ground.

2— The potential difference is adjusted to its maximum value with F1409.

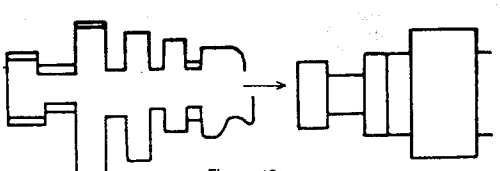


Figure 13

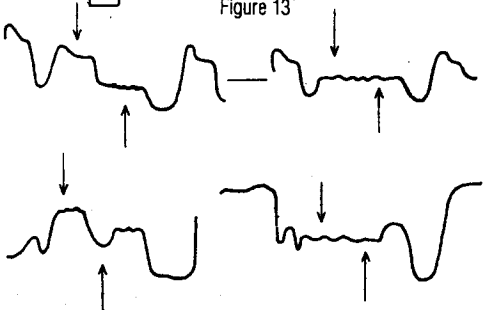


Figure 14

## SECAM COLOR TRAP ADJUSTMENT:

1— Y Signal is observed from 15th pin of the board and color carrier signal is adjusted to its minimum level with F1405.

## SECAM DISCRIMINATOR ADJUSTMENT:

1— The (R-Y) and (B-Y) signals are observed from teh 14th and 15th pin of teh board.

2— The signals which are indicated with arrows in Figure 14 are adjusted so that they come to same level.

# CONVERGENCE ADJUSTMENTS

**Note:** Before attempting any convergence adjustments, the receiver should be operated for at least fifteen minutes.

## • Centre Convergence Adjustment

1. Receive crosshatch pattern with a colour bar signal generator.
2. Adjust the BRIGHTNESS and CONTRAST Controls for well defined pattern.
3. Adjust two tabs of the 4-Pole Magnets to change the angle between them (See figure 16.) and superimpose red and blue vertical lines in the centrel area of the picture screen. (See figure 17.)
4. Turn the both tabs at the same time keeping the constant angle to superimpose red and blue horizontal lines at the centre of the screen. (See figure 17. )
5. Adjust two tabs of 6-Pole Magnets to superimpose red/blue line and green one. Adjusting the angle affects the vertical lines and rotating both magnets affects the horizontal lines.
6. Repeat adjustments 3,4,5 to ensure best convergence, the adjustment must be undertaken with great care because of the interaction between 4 and 6 pole magnets.

## • Circumference Convergence Adjustment

1. Loosen the clamping screw of deflection yoke to allow the yoke to tilt.
2. Put a wedge as shown in figure 15 temporarily. (Do not remove cover paper on adhesive part of the wedge.)
3. Tilt front of the deflection yoke up or down to obtain better convergence in circumference. (See figure 17. ) Push the mounted wedge into the space between picture tube and the yoke to fix the yoke temporarily.
4. Put other wedge into bottom space and remove the cover paper to stick.
5. Tilt front of the yoke right or left to obtain better convergence in circumference. (See figure 17.)
6. Keep the yoke position and put another wedge in either upper space. Remove cover paper and stick the wedge on picture tube to fix the yoke.
7. Detach the temporarily mounted wedge and put it in another upper space. Stick it on picture tube to fix the yoke.
8. After fixing three wedges, recheck overall convergence. Tighten the screw firmly to fix the yoke and check the yoke is firm.
9. Stick 3 adhesive tapes on wedges.

## CONVERGENCE COMPENSATOR

Compensators L462A and L462B are used to correct misconvergence (Red-Green) at the top center or bottom center on screen, when the misconvergence is still evident even though the yoke adjustment is tried. Compensatör L462C is also used to correct misconvergence (Vertical shift of Red or Blue) at four corners on screen.

1. To correct horizontal misconvergence (Red-Green), put compensator L462A on the yoke back (see figure right) to find a position for minimizing misconvergence. Mark the position and remove protective paper on the rear of L462A to stick it in place. Apply adhesives on both of yoke and L462A.
2. To correct vertical misconergence (Red-Green), put the tips of compensator L462B into either of holes on the yoke core and apply adhesives.
3. To correct up or down shift of Red at top right or bottom right corner, put compensator L462C at the point 1 or 2 on the picture tube (see figure right.) to find a position for minimizing misconvergence. Mark the position and remove protective paper on the rear of L462C to stick it in place.

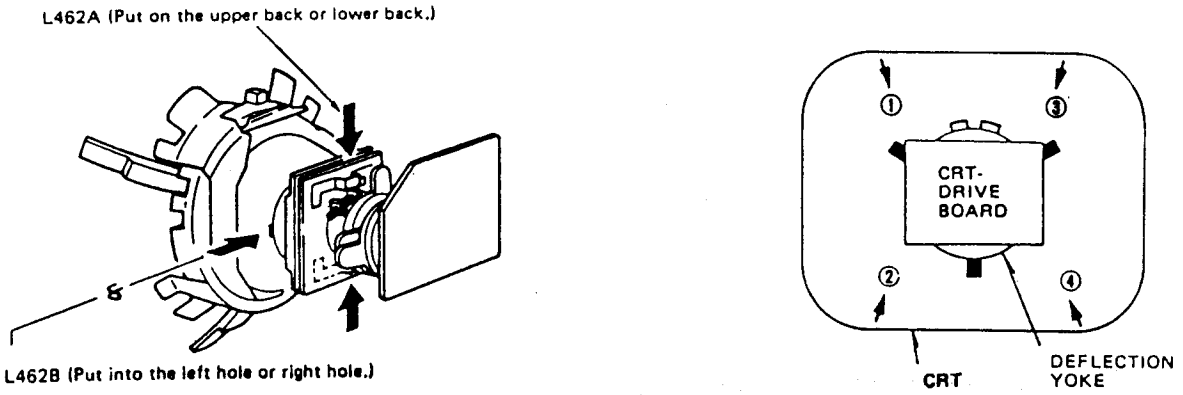



Figure 15.

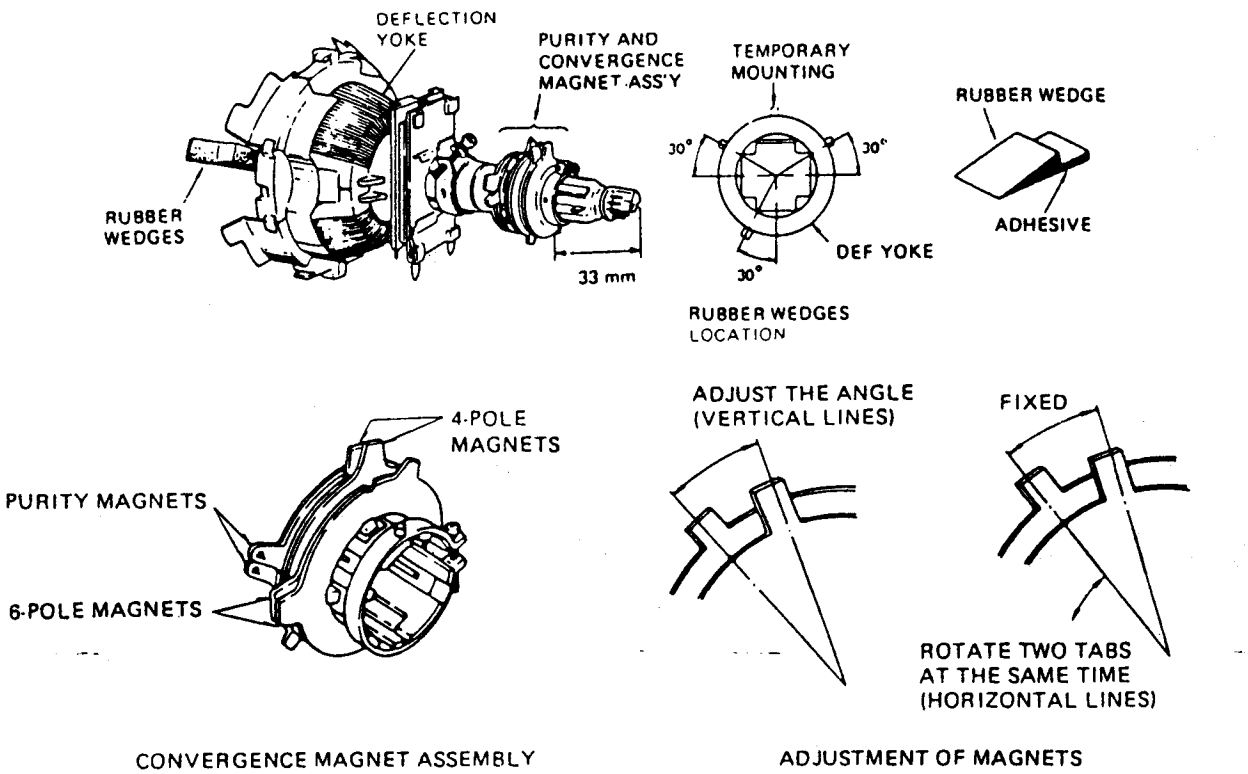
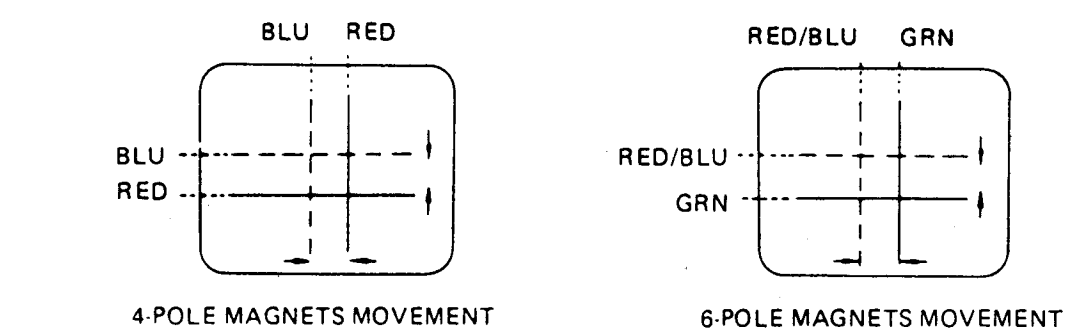
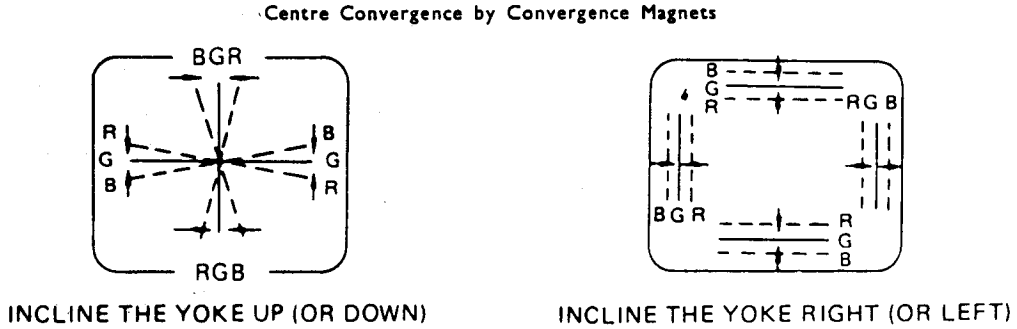



Figure 16.




Centre Convergence by Convergence Magnets




Circumference Convergence by DEF Yoke



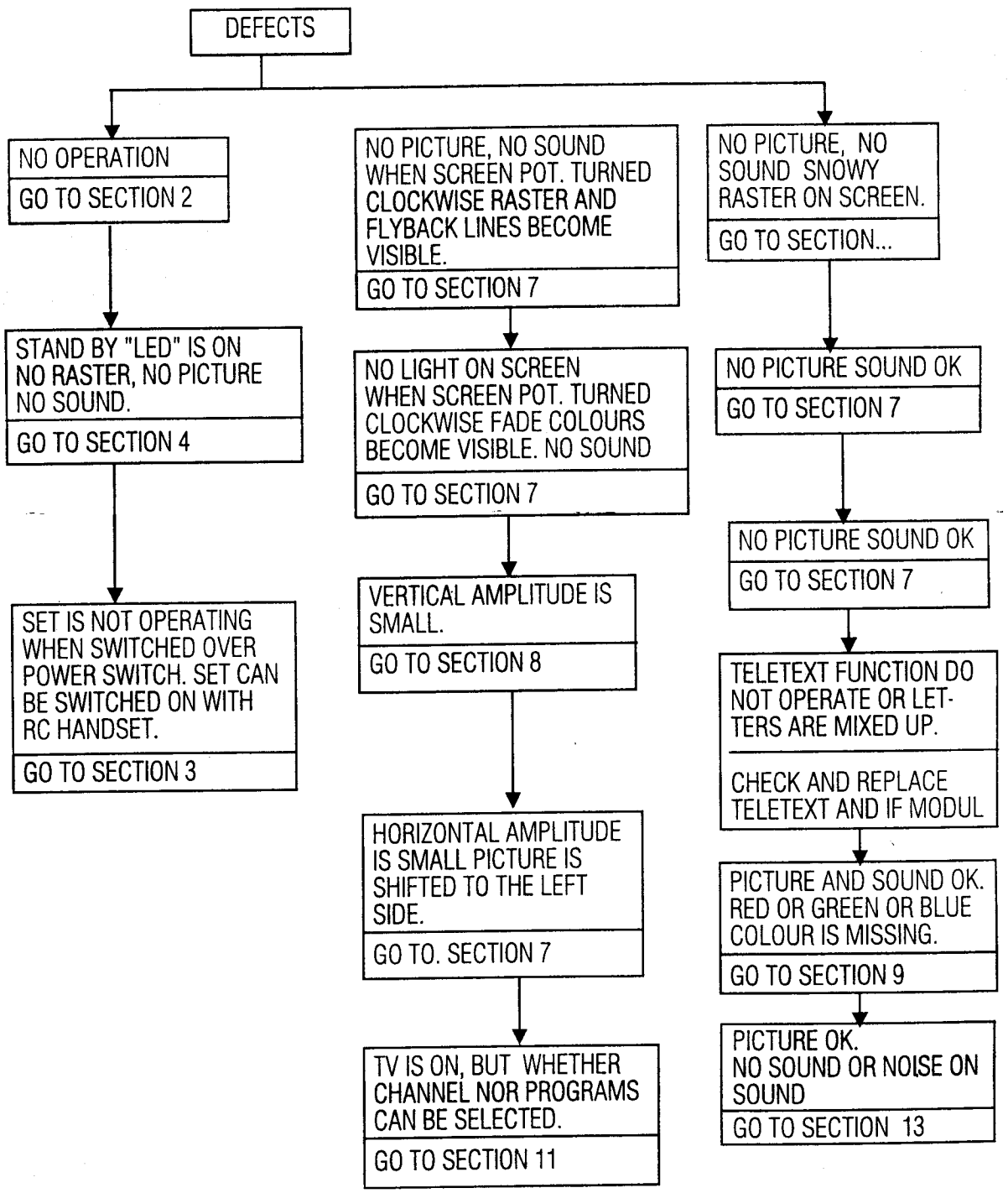
Figure 17. Dot Movement Pattern

| CHSASIS / SCREEN SIZES / CPT MANUFACTURES | 14" | 15" | 20" | 21" | 25" | 28" |
|---|---|---|---|---|---|---|
| GOLDSTAR | A34 KCQ 12XX01 (T)<br>370 HUB 22-TC01 | | A48 KCS 12XX27 | A51 KAK 12XX05 (T) | | |
| SAMSUNG | 37 GGA 85X-TC01<br>3708B | | A51 GGD95X-TC | 54 HGB 99X-TC | | |
| ORION | A343 LL70X23 | A36 JSW 90X01 | A48 ELL 90X01 (T) | | | |
| HITACHI | | A36 JUF60X06 | A48 JSK61X01 (T) | A51 JFC 61X13 | | |
| TOSHIBA | | A36 JAR 40X03 (T) | | A51 JRU 40X01 (T) | | |
| PHILIPS | | A36 EAM 00X01 (T) | | A51 EAL 06X01 | | |
| VIDEOCOLOR | | | | A51 EBV 13XX01 | A59 ECY 13X38<br>R1235: 1 OHM, 1W<br>L810: 90 uH | A66 ECY 13X38<br>R1235 : 1 OHM, 1W<br>L810 : 70 uH |
| NOKIA | | | | A51 ECQ 00X01 | A59 ECF 10X05<br>R1235:2.2 OHM, 1W. | A66 ECF 10X05<br>R1235:2.2 OHM, 1W |
| WF | | | A48 ECR 11X01 | | | |

R1235 IS FOR ALL CRT's with 90° DEFLECTION ANGLE IS 0.1 OHM FUSEABLE TYPE RESISTOR.

# ① TROUBLE SHOOTING

1 -TROUBLE SHOOTING GUIDE
2 -GENERAL POWER SUPPLY DEFECTS
3 -POWER I-POWER SUPPLY DEFECTS
4 -POWER II-POWER SUPPLY DEFECTS
5 -SWITCH MODE TRANSFORMER DEFECTS
6 -PROTECTION CIRCUIT DEFECTS
7 -DEFECTS RELATED TO DARK SCREEN
8 -DEFLECTION CIRCUIT DEFECTS
9 -TEA 2029 AND PERIPHERIAL DEFECTS
10 -COLOUR DECODER DEFECTS
11 -CRT DRIVE BOARD AND IC501 DEFECTS
12 -MICROPROCESSOR DEFECTS
13 -SOUND CIRCUIT DEFECTS


DEFECTS
NO OPERATION
GO TO SECTION 2
STAND BY "LED" IS ON NO RASTER, NO PICTURE NO SOUND.
GO TO SECTION 4
SET IS NOT OPERATING WHEN SWITCHED OVER POWER SWITCH. SET CAN BE SWITCHED ON WITH RC HANDSET.
GO TO SECTION 3
NO PICTURE, NO SOUND WHEN SCREEN POT. TURNED CLOCKWISE RASTER AND FLYBACK LINES BECOME VISIBLE.
GO TO SECTION 7
NO LIGHT ON SCREEN WHEN SCREEN POT. TURNED CLOCKWISE FADE COLOURS BECOME VISIBLE. NO SOUND
GO TO SECTION 7
VERTICAL AMPLITUDE IS SMALL.
GO TO SECTION 8
HORIZONTAL AMPLITUDE IS SMALL PICTURE IS SHIFTED TO THE LEFT SIDE.
GO TO. SECTION 7
TV IS ON, BUT WHETHER CHANNEL NOR PROGRAMS CAN BE SELECTED.
GO TO SECTION 11
NO PICTURE, NO SOUND SNOWY RASTER ON SCREEN.
GO TO SECTION...
NO PICTURE SOUND OK
GO TO SECTION 7
NO PICTURE SOUND OK
GO TO SECTION 7
TELETEXT FUNCTION DO NOT OPERATE OR LET-TERS ARE MIXED UP.
CHECK AND REPLACE TELETEXT AND IF MODUL
PICTURE AND SOUND OK. RED OR GREEN OR BLUE COLOUR IS MISSING.
GO TO SECTION 9
PICTURE OK. NO SOUND OR NOISE ON SOUND
GO TO SECTION 13

**NOTE:** ALL ANALOG CONTROL (LUMINANCE, CONTRAST, COLOUR, VOLUME), SHOULD BE AT MEDIUM LEVEL.

# EXPLODED VIEW

## (14"-15" MODELS)

| NO | PART NO | DESCRIPTION | QTY |
|---|---|---|---|
| 38 | 056.060 | CPT, 15" | 1 |
| 37 | 056.737 | CPT, 14" | 1 |
| 36 | 64A.214 | CHASSIS FRONT BRACKET-2 | 1 |
| 35 | 64A.213 | CHASSIS FRONT BRACKET | 1 |
| 34 | 033.929 | SHIELD WIRE | 1 |
| 33 | 011.360 | SCREW 3.9x13 | 2 |
| 32 | 50V.188 | TELETEXT MODULE | 1 |
| 31 | 54K.208 | HOLDER TELETEXT | 1 |
| 30 | 54G.203 | HOLDER, TX ASSY | 2 |
| 29 | 011.614 | SCREW 2.9x9.5 | 2 |
| 28 | 833.215 | POWER CORD HANGER | 1 |
| 27 | 60U.903 | RUBBER CONTACT | 1 |
| 26 | 60U.207 | PLATE FUNCTION | 1 |
| 25 | 011.956 | SCREW 3.9x13 | 1 |
| 24 | 64A.204 | POWER CORD HANGER | 1 |
| 23 | 60U.203 | LENS LED | 1 |
| 22 | 51A.301 | SPRING POWER KNOB | 1 |
| 21 | 64A.211 | PLATE REMOTE CONTROL | 1 |
| 20 | 60U.206 | PLATE FUNCTION I | 1 |
| 19 | 60U.210 | PLATE FUNCTION II | 1 |
| 18 | 60U.212 | DECO PANEL | 2 |
| 17 | 64A.206 | CONTROL UNIT DOOR | 1 |
| 16 | 60U.202 | LED COVER | 1 |
| 15 | 60U.208 | POWER KNOB | 1 |
| 14 | 64A.202 | PANEL | 2 |
| 13 | 60U.902 | RUBBER CONTACT-II | 1 |
| 12 | 60U.901 | RUBBER CONTACT-I | 1 |
| 11 | 011.814 | SCREW | 5 |
| 10 | 64A.172 | CONTROL UNIT | 1 |
| 9 | ".110 | CHASSIS PCB | 1 |
| 8 | 505.220 | CHASSIS BRACKET | 1 |
| 7 | 011.507 | SCREW CPT (EJOT) | 4 |
| 6 | 011.507 | SCREW CPT (EJOT) | 4 |
| 5 | 710.107 | SPEAKER | 1 |
| 4 | 011.950 | SCREW 3.9x13 | 4 |
| 3 | 64A.203 | HOLDER, BACK COVER | 1 |
| 2 | 64A.205 | BACK COVER | 1 |
| 1 | 65A.201/64A.201 | FRONT FRAME 15"/14" | 1 |

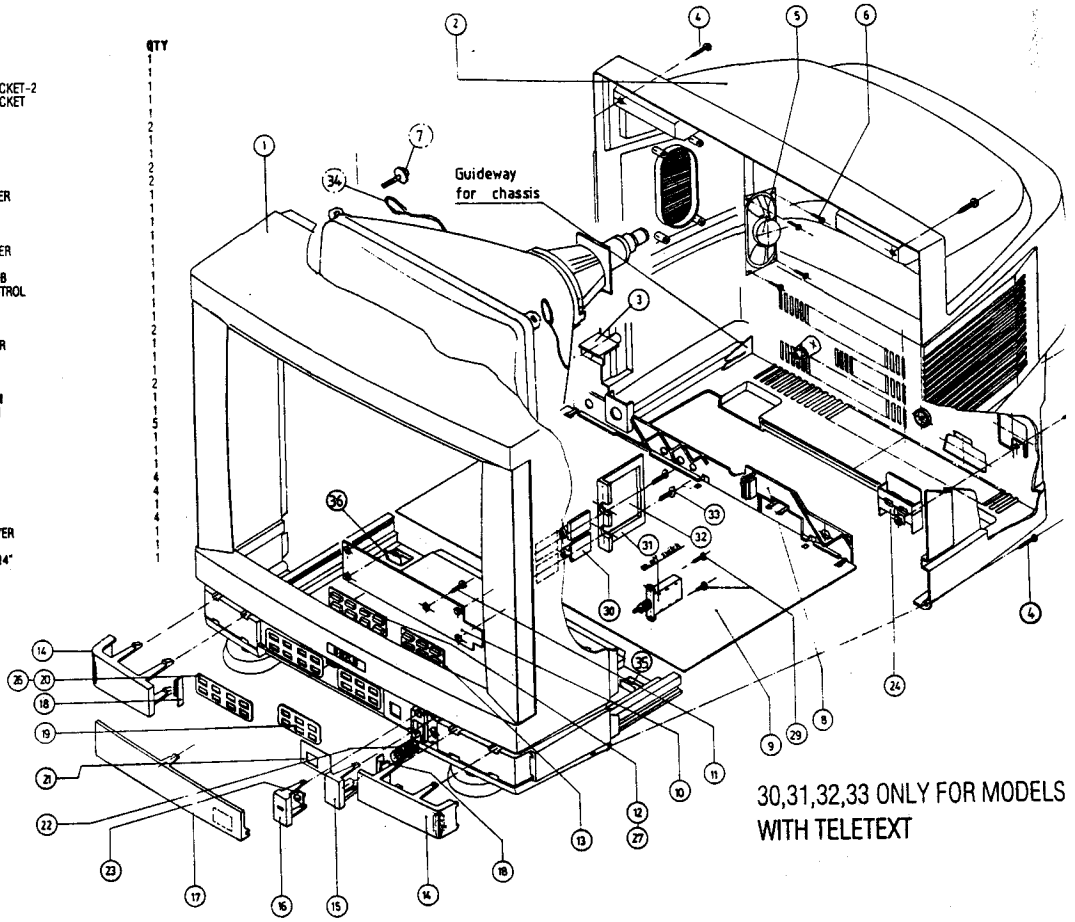



Figure 3

30,31,32,33 ONLY FOR MODELS WITH TELETEXT

27,28,29 ONLY FOR MODELS WITH TELETEXT
28 ONLY FOR 21" MODELS

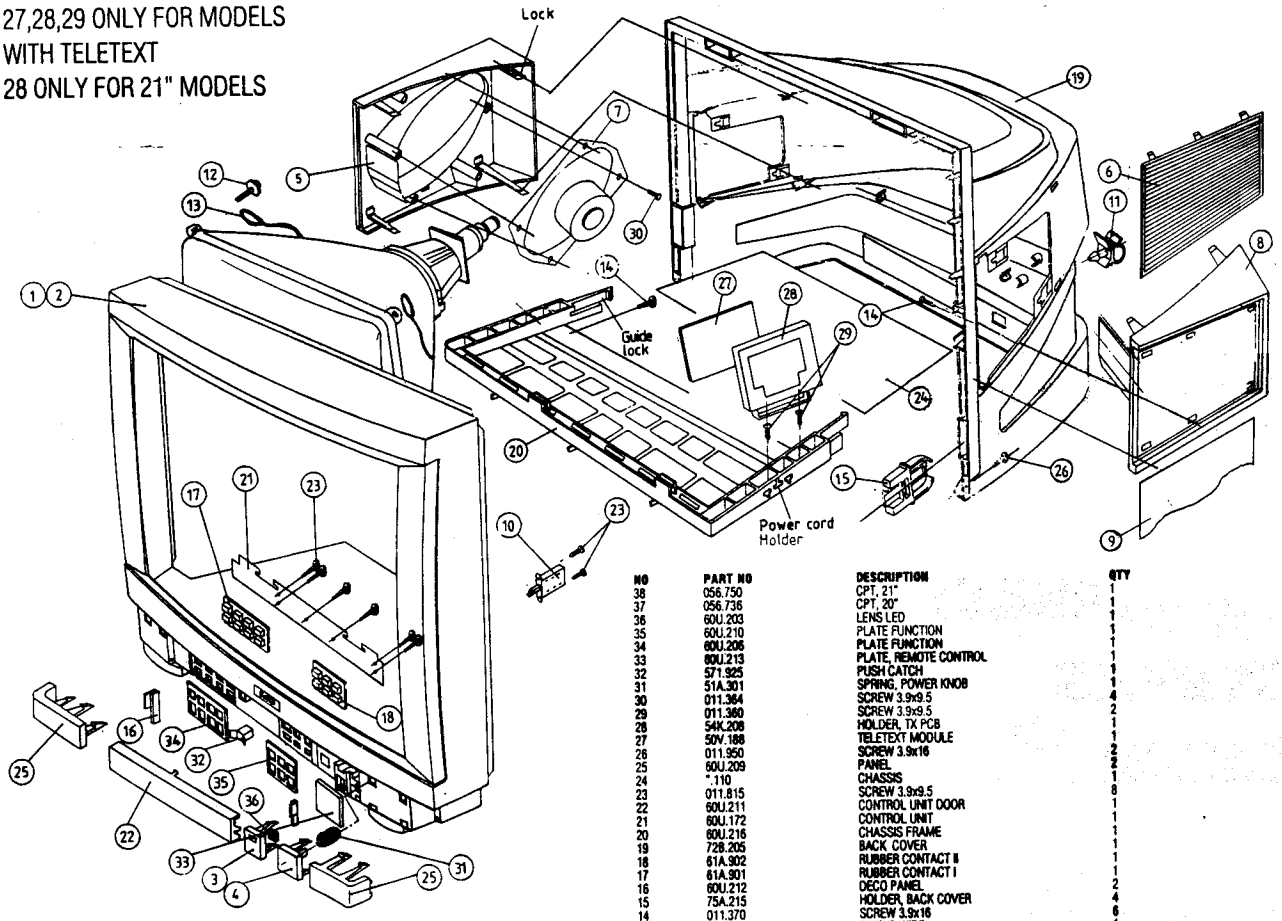
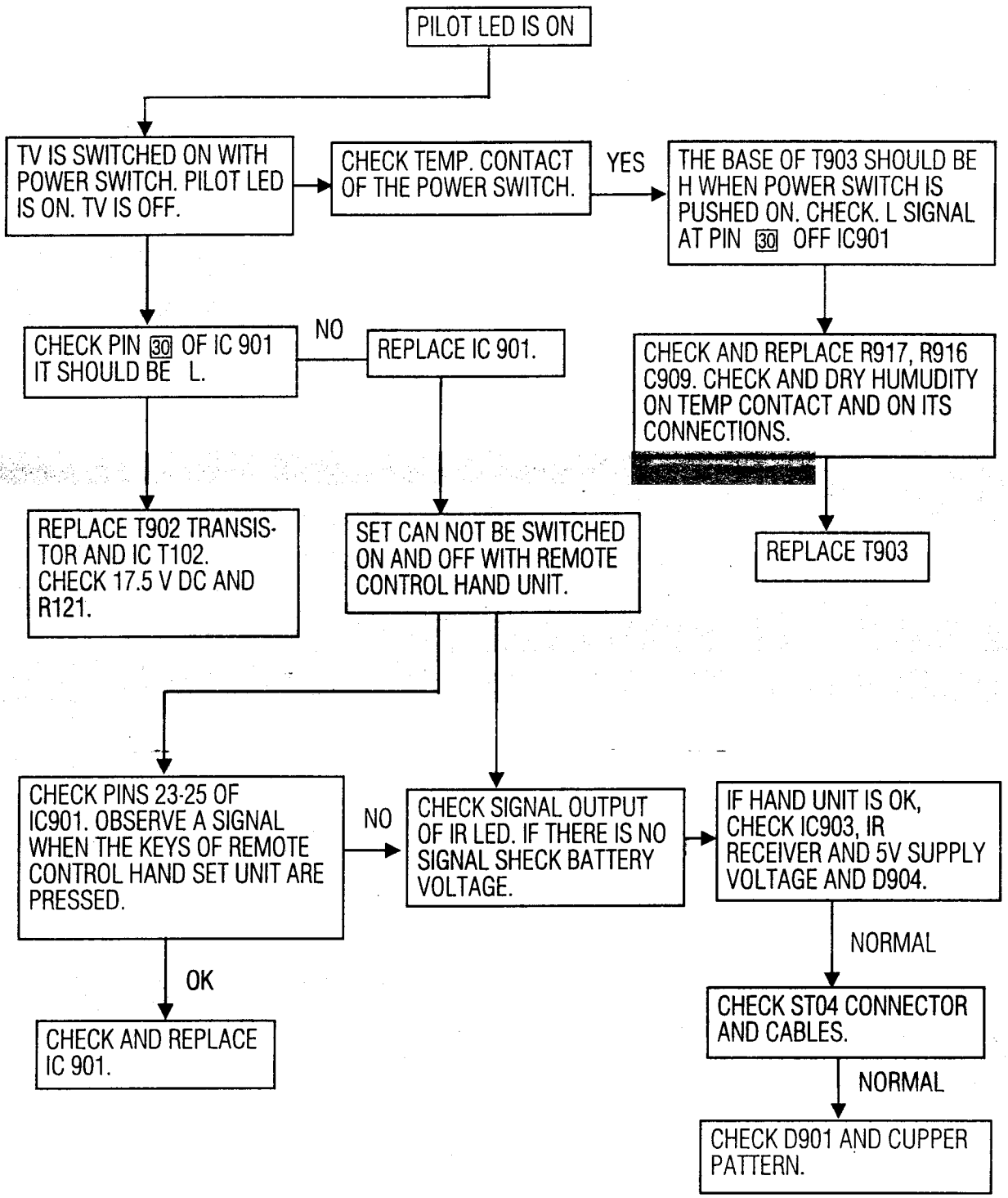



Figure 4

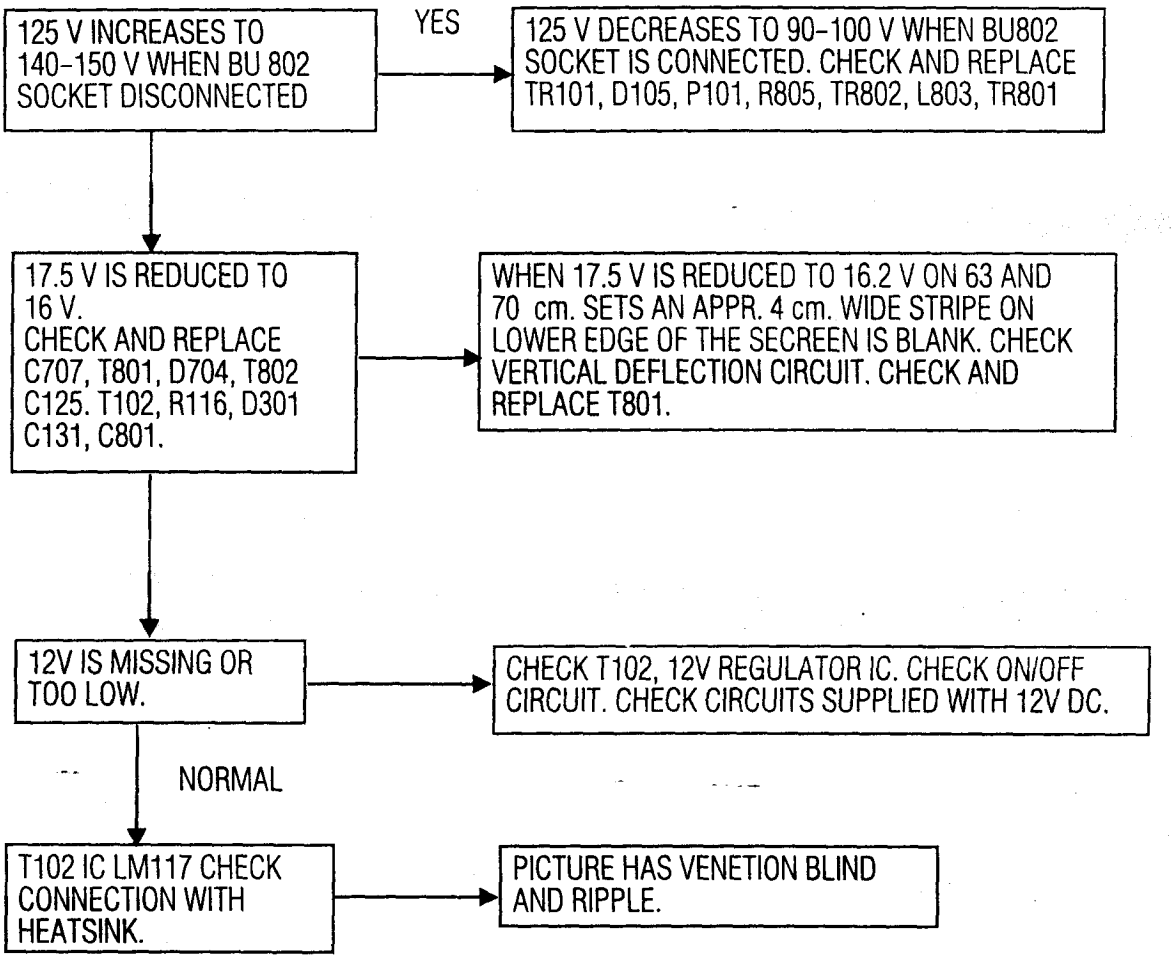
## (20"-21" MODELS)

| NO | PART NO | DESCRIPTION | QTY |
|---|---|---|---|
| 38 | 056.750 | CPT, 21" | 1 |
| 37 | 056.736 | CPT, 20" | 1 |
| 36 | 60U.203 | LENS LED | 1 |
| 35 | 60U.210 | PLATE FUNCTION | 1 |
| 34 | 60U.206 | PLATE FUNCTION | 1 |
| 33 | 60U.213 | PLATE, REMOTE CONTROL | 1 |
| 32 | 571.925 | PUSH CATCH | 1 |
| 31 | 51A.301 | SPRING, POWER KNOB | 1 |
| 30 | 011.364 | SCREW 3.9x9.5 | 4 |
| 29 | 011.360 | SCREW 3.9x9.5 | 2 |
| 28 | 54K.208 | HOLDER, TX PCB | 1 |
| 27 | 50V.188 | TELETEXT MODULE | 1 |
| 26 | 011.950 | SCREW 3.9x16 | 2 |
| 25 | 60U.209 | PANEL | 2 |
| 24 | ".110 | CHASSIS | 1 |
| 23 | 011.815 | SCREW 3.9x9.5 | 8 |
| 22 | 60U.211 | CONTROL UNIT DOOR | 1 |
| 21 | 60U.172 | CONTROL UNIT | 1 |
| 20 | 60U.216 | CHASSIS FRAME | 1 |
| 19 | 728.205 | BACK COVER | 1 |
| 18 | 61A.902 | RUBBER CONTACT II | 1 |
| 17 | 61A.901 | RUBBER CONTACT I | 1 |
| 16 | 60U.212 | DECO PANEL | 2 |
| 15 | 75A.215 | HOLDER, BACK COVER | 4 |
| 14 | 011.370 | SCREW 3.9x16 | 6 |
| 13 | 033.929 | SHIELD WIRE | 1 |
| 12 | 011.507 | SCREW CPT (EJOT) | 4 |
| 11 | 833.215 | POWER CORD HANGER | 1 |
| 10 | 010.770 | POWER SWITCH | 1 |
| 9 | 728.901 | CLOTH, SPEAKER | 2 |
| 8 | 72W.207 | HOLDER SPEAKER | 1 |
| 7 | 850.107 | SPEAKER | 1 |
| 6 | 728.240 | GRID, SPEAKER | 2 |
| 5 | 728.206 | HOLDER SPEAKER | 2 |
| 4 | [illegible] | POWER KNOB | 1 |
| 3 | [illegible] | LED COVER | 1 |
| 2 | [illegible] | FRONT FRAME (21") | 1 |
| 1 | [illegible] | FRONT FRAME (20") | 1 |

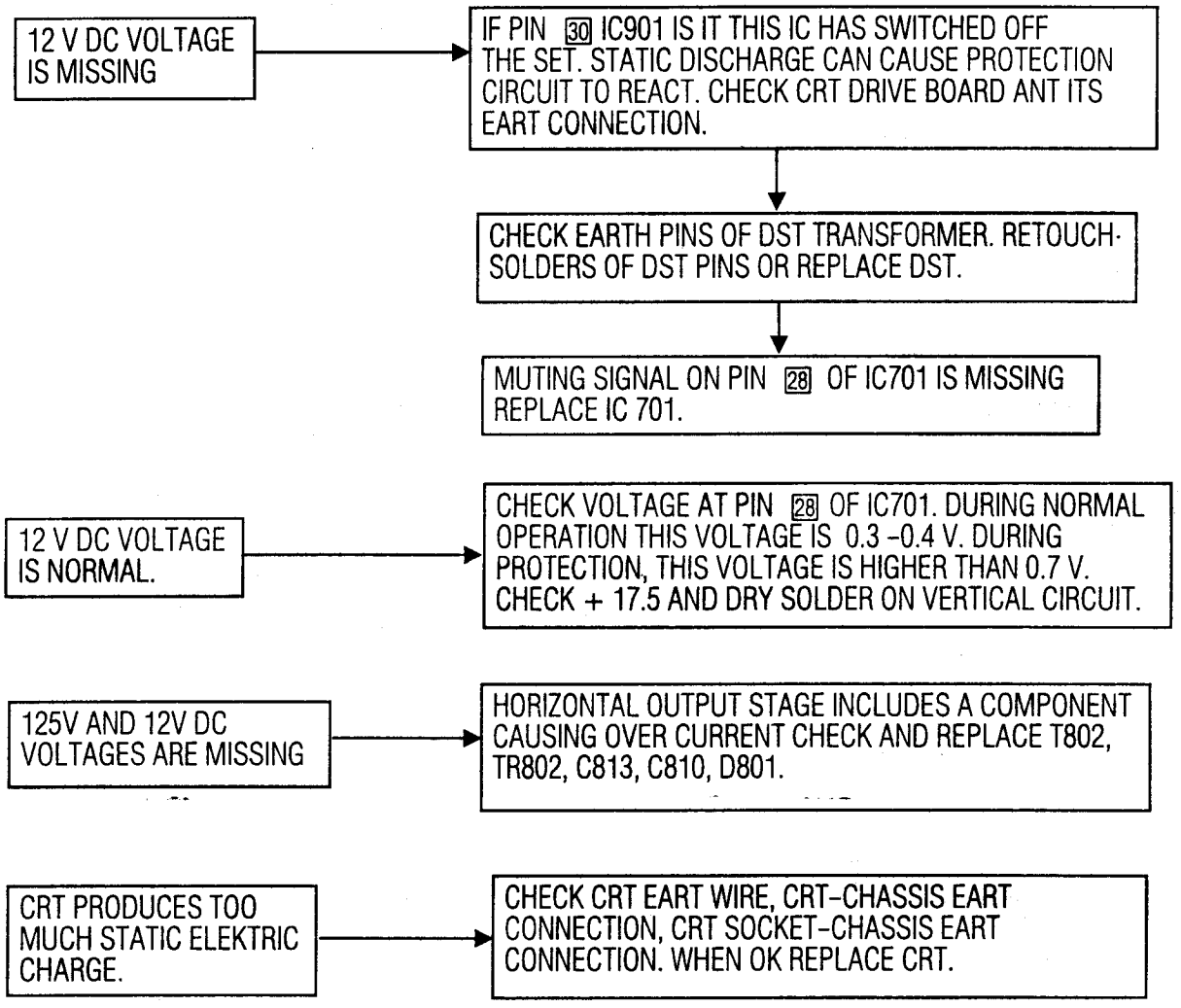
## ④
## POWER II DEFECTS


PILOT LED IS ON
TV IS SWITCHED ON WITH POWER SWITCH. PILOT LED IS ON. TV IS OFF.
CHECK TEMP. CONTACT OF THE POWER SWITCH.
YES
THE BASE OF T903 SHOULD BE H WHEN POWER SWITCH IS PUSHED ON. CHECK. L SIGNAL AT PIN 30 OFF IC901
CHECK PIN 30 OF IC 901 IT SHOULD BE L.
NO
REPLACE IC 901.
CHECK AND REPLACE R917, R916 C909. CHECK AND DRY HUMUDITY ON TEMP CONTACT AND ON ITS CONNECTIONS.
REPLACE T902 TRANSISTOR AND IC T102. CHECK 17.5 V DC AND R121.
SET CAN NOT BE SWITCHED ON AND OFF WITH REMOTE CONTROL HAND UNIT.
REPLACE T903
CHECK PINS 23-25 OF IC901. OBSERVE A SIGNAL WHEN THE KEYS OF REMOTE CONTROL HAND SET UNIT ARE PRESSED.
NO
CHECK SIGNAL OUTPUT OF IR LED. IF THERE IS NO SIGNAL SHECK BATTERY VOLTAGE.
IF HAND UNIT IS OK, CHECK IC903, IR RECEIVER AND 5V SUPPLY VOLTAGE AND D904.
OK
NORMAL
CHECK AND REPLACE IC 901.
CHECK ST04 CONNECTOR AND CABLES.
NORMAL
CHECK D901 AND CUPPER PATTERN.

## ⑤
## SWITCH MODE TRANSFORMER TR101 AND PERIPERIAL DEFECTS


125 V INCREASES TO 140-150 V WHEN BU 802 SOCKET DISCONNECTED
YES
125 V DECREASES TO 90-100 V WHEN BU802 SOCKET IS CONNECTED. CHECK AND REPLACE TR101, D105, P101, R805, TR802, L803, TR801
17.5 V IS REDUCED TO 16 V. CHECK AND REPLACE C707, T801, D704, T802 C125. T102, R116, D301 C131, C801.
WHEN 17.5 V IS REDUCED TO 16.2 V ON 63 AND 70 cm. SETS AN APPR. 4 cm. WIDE STRIPE ON LOWER EDGE OF THE SECREEN IS BLANK. CHECK VERTICAL DEFLECTION CIRCUIT. CHECK AND REPLACE T801.
12V IS MISSING OR TOO LOW.
CHECK T102, 12V REGULATOR IC. CHECK ON/OFF CIRCUIT. CHECK CIRCUITS SUPPLIED WITH 12V DC.
NORMAL
T102 IC LM117 CHECK CONNECTION WITH HEATSINK.
PICTURE HAS VENETION BLIND AND RIPPLE.

## ⑥
## SET GOES TO STANDBY DURING OPERATION


12 V DC VOLTAGE IS MISSING
IF PIN 30 IC901 IS IT THIS IC HAS SWITCHED OFF THE SET. STATIC DISCHARGE CAN CAUSE PROTECTION CIRCUIT TO REACT. CHECK CRT DRIVE BOARD ANT ITS EART CONNECTION.
CHECK EARTH PINS OF DST TRANSFORMER. RETOUCH· SOLDERS OF DST PINS OR REPLACE DST.
MUTING SIGNAL ON PIN 28 OF IC701 IS MISSING REPLACE IC 701.
12 V DC VOLTAGE IS NORMAL.
CHECK VOLTAGE AT PIN 28 OF IC701. DURING NORMAL OPERATION THIS VOLTAGE IS 0.3 -0.4 V. DURING PROTECTION, THIS VOLTAGE IS HIGHER THAN 0.7 V. CHECK + 17.5 AND DRY SOLDER ON VERTICAL CIRCUIT.
125V AND 12V DC VOLTAGES ARE MISSING
HORIZONTAL OUTPUT STAGE INCLUDES A COMPONENT CAUSING OVER CURRENT CHECK AND REPLACE T802, TR802, C813, C810, D801.
CRT PRODUCES TOO MUCH STATIC ELEKTRIC CHARGE.
CHECK CRT EART WIRE, CRT-CHASSIS EART CONNECTION, CRT SOCKET-CHASSIS EART CONNECTION. WHEN OK REPLACE CRT.

NOTICE: MAINS VOLTAGE OUTLETS IN COSTUMER HOUSE HAS TO BE CHECKED, BEFORE STARTING ANY OFF ABOVE MENTIONED MEASUREMENTS.

## ⑦

SCREEN IS DARK. WHEN SCREEN POTENTIOMETER TURNED CLOCKWISE RASTER AND FLYBACKLINES APPEAR ON SCREEN.

CHECK SDA AND SCL SIGNALS AND 4V DC AT PINS [31] ,[32] OF IC 901.

IF ONE OF SDA OR SCL IS MISSING.

IN MONO SETS SDA AND SCL SIGNAL LİNES ARE SEPARATED FROM TELETEXT BOARD TUNER AND MEMORY IC. THIS WAY SHORT CIRCUIT OF THIS SIGNALS CAN BE LOCALIZED. IN STEREO SETS SDA AND SCL SIGNAL LINES ARE SEPARATED FROM STEREO BOARD OR IF BOARD. SHORT CIRCUIT CAN BE LOCALIZED, AND DEFECTIVE MODULE CAN BE REPLACED.

SDA-SCL SIGNALS ARE NORMAL, SCREEN IS DARK.

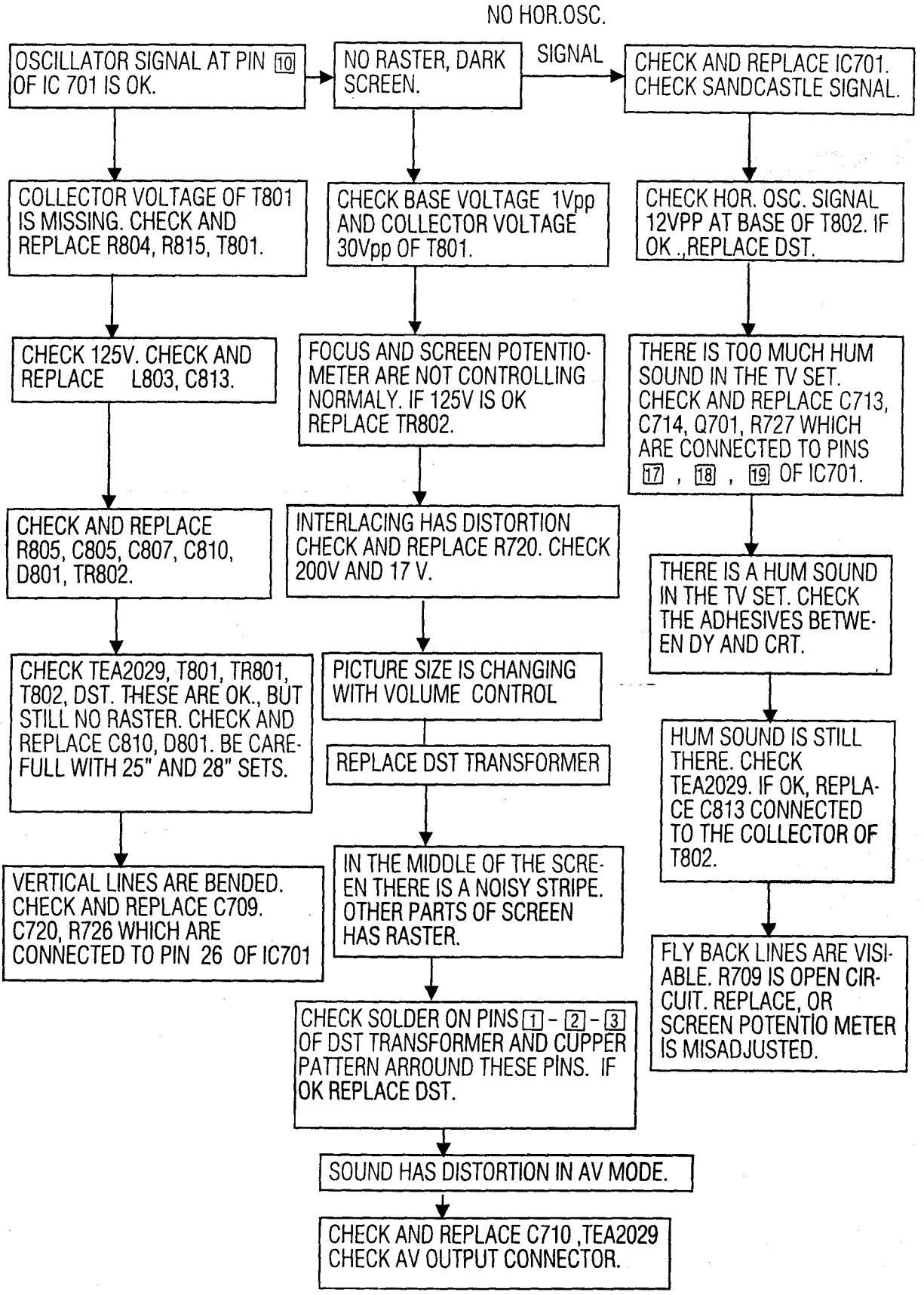
CHECK PIN VOLTAGES AND SURROUND COMPONENTS OF IC501. CHECK 1 V AT PIN [26]. PINS [19] , [20] ARE FOR CONTRAST AND BRIGHTNESS. CHECK VOLTAGES AT THESE PINS VARIING BETWEEN 1-4.5 V.CHECK 12V DC AT PIN [6]. CHECK Y-LUMINANCE SIGNAL ON PIN [15]. IF ALL ITEMS ARE NORMAL , IC501 OR CRT DRIVE BOARD IS DEFECTIVE.

REPLACE CRT DRIVE BOARD. CHECK AND REPLACE D501, D503, C503.
CHECK VOLTAGE AT PIN [9] OF IC501.

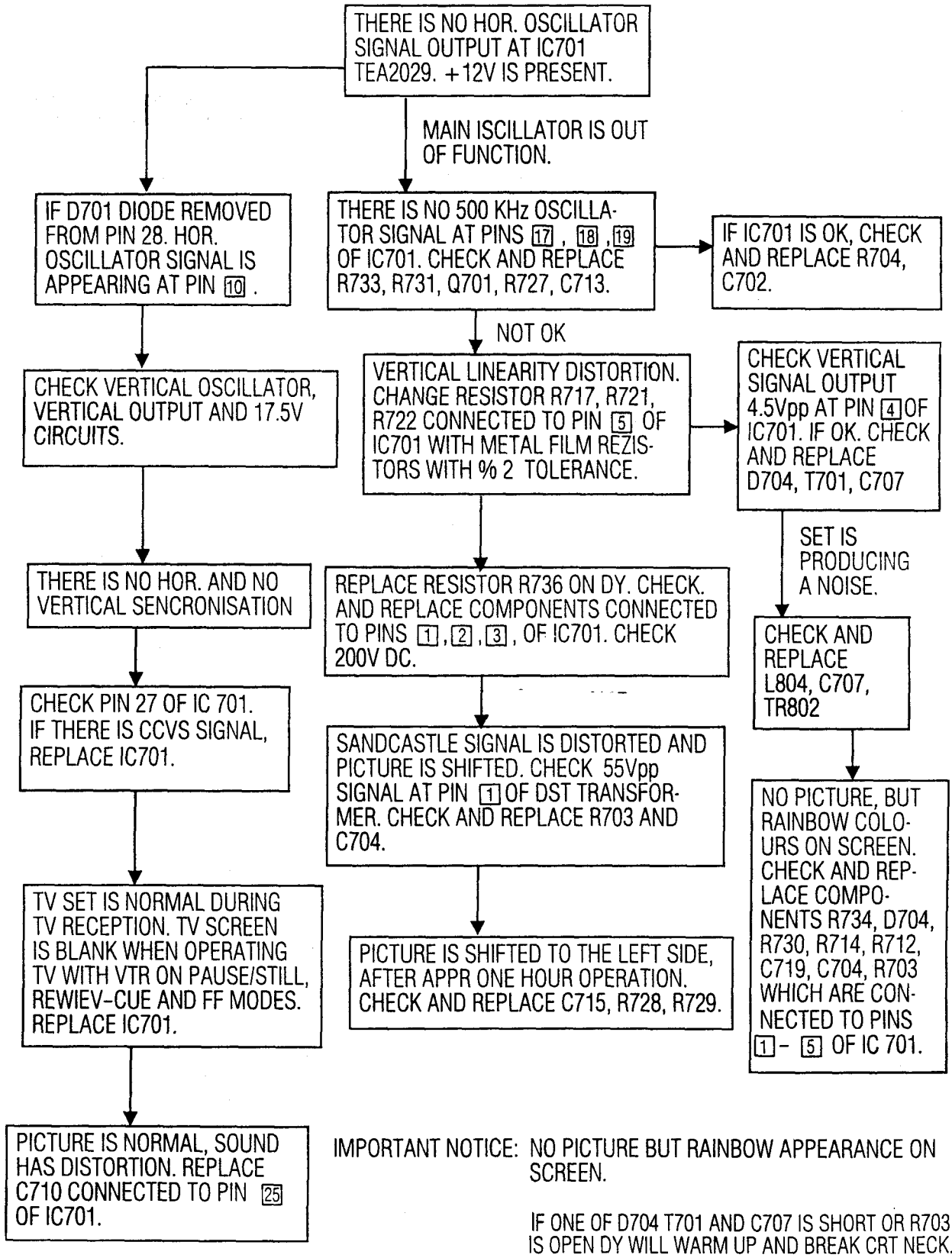
SCREEN IS DARK. RASTER IS AVAIBLE.

PUSH AV BUTTON ON REMOTE CONTROL HAND UNIT. CHECK SQUARE WAVE ON PIN [15] OF IC 501. IF OK, CHECK SQUARE WAVE AT PINS [1], [3], [5].
IF OK, CRT DRIVE BOARD IS DEFECTIVE. IF NOT, REPLACE IC501.

# 8
# VERTICAL-HORIZONTAL OUTPUT AND DST CIRCUIT DEFECTS

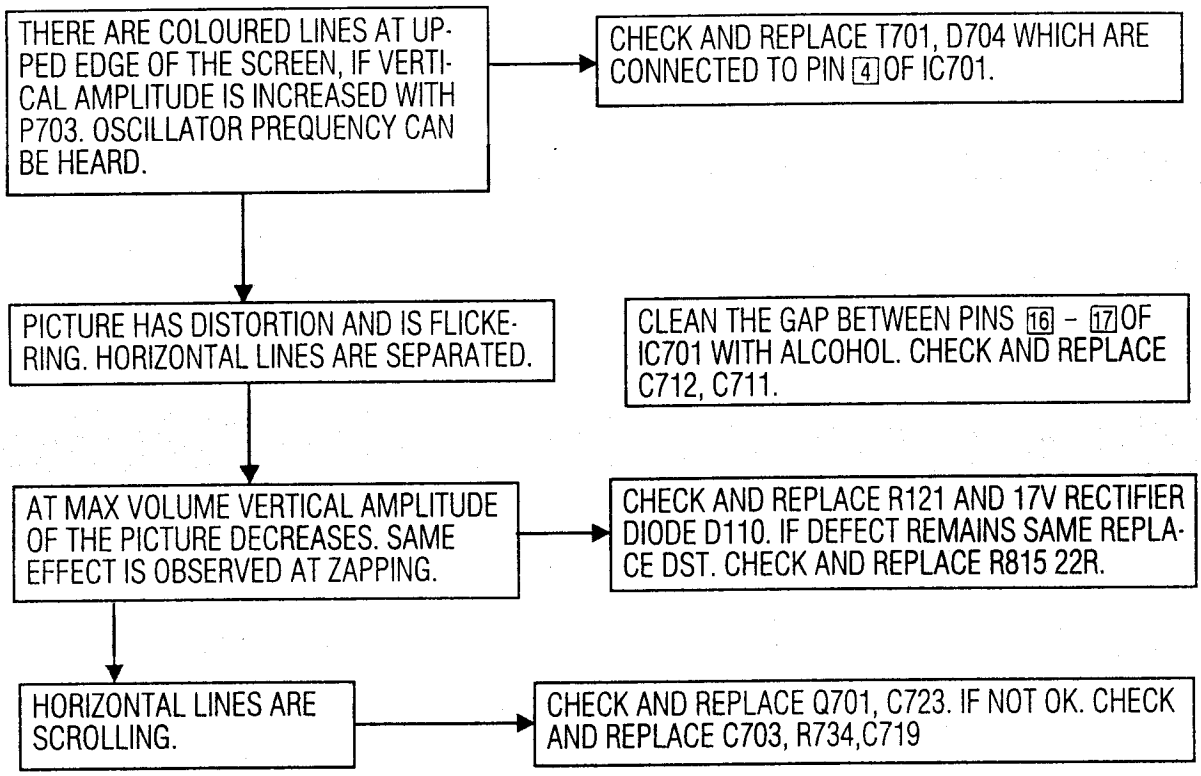

NO HOR.OSC.
OSCILLATOR SIGNAL AT PIN 10 OF IC 701 IS OK.
NO RASTER, DARK SCREEN.
SIGNAL
CHECK AND REPLACE IC701. CHECK SANDCASTLE SIGNAL.
COLLECTOR VOLTAGE OF T801 IS MISSING. CHECK AND REPLACE R804, R815, T801.
CHECK BASE VOLTAGE 1Vpp AND COLLECTOR VOLTAGE 30Vpp OF T801.
CHECK HOR. OSC. SIGNAL 12VPP AT BASE OF T802. IF OK .,REPLACE DST.
CHECK 125V. CHECK AND REPLACE L803, C813.
FOCUS AND SCREEN POTENTIO-METER ARE NOT CONTROLLING NORMALY. IF 125V IS OK REPLACE TR802.
THERE IS TOO MUCH HUM SOUND IN THE TV SET. CHECK AND REPLACE C713, C714, Q701, R727 WHICH ARE CONNECTED TO PINS 17 , 18 , 19 OF IC701.
CHECK AND REPLACE R805, C805, C807, C810, D801, TR802.
INTERLACING HAS DISTORTION CHECK AND REPLACE R720. CHECK 200V AND 17 V.
THERE IS A HUM SOUND IN THE TV SET. CHECK THE ADHESIVES BETWE-EN DY AND CRT.
CHECK TEA2029, T801, TR801, T802, DST. THESE ARE OK., BUT STILL NO RASTER. CHECK AND REPLACE C810, D801. BE CARE-FULL WITH 25" AND 28" SETS.
PICTURE SIZE IS CHANGING WITH VOLUME CONTROL
REPLACE DST TRANSFORMER
HUM SOUND IS STILL THERE. CHECK TEA2029. IF OK, REPLA-CE C813 CONNECTED TO THE COLLECTOR OF T802.
VERTICAL LINES ARE BENDED. CHECK AND REPLACE C709. C720, R726 WHICH ARE CONNECTED TO PIN 26 OF IC701
IN THE MIDDLE OF THE SCRE-EN THERE IS A NOISY STRIPE. OTHER PARTS OF SCREEN HAS RASTER.
FLY BACK LINES ARE VISI-ABLE. R709 IS OPEN CIR-CUIT. REPLACE, OR SCREEN POTENTIO METER IS MISADJUSTED.
CHECK SOLDER ON PINS 1 - 2 - 3 OF DST TRANSFORMER AND CUPPER PATTERN ARROUND THESE PINS. IF OK REPLACE DST.
SOUND HAS DISTORTION IN AV MODE.
CHECK AND REPLACE C710 ,TEA2029 CHECK AV OUTPUT CONNECTOR.

# 9
# TEA 2029 AND PERIPHERIAL CIRCUIT DEFECTS

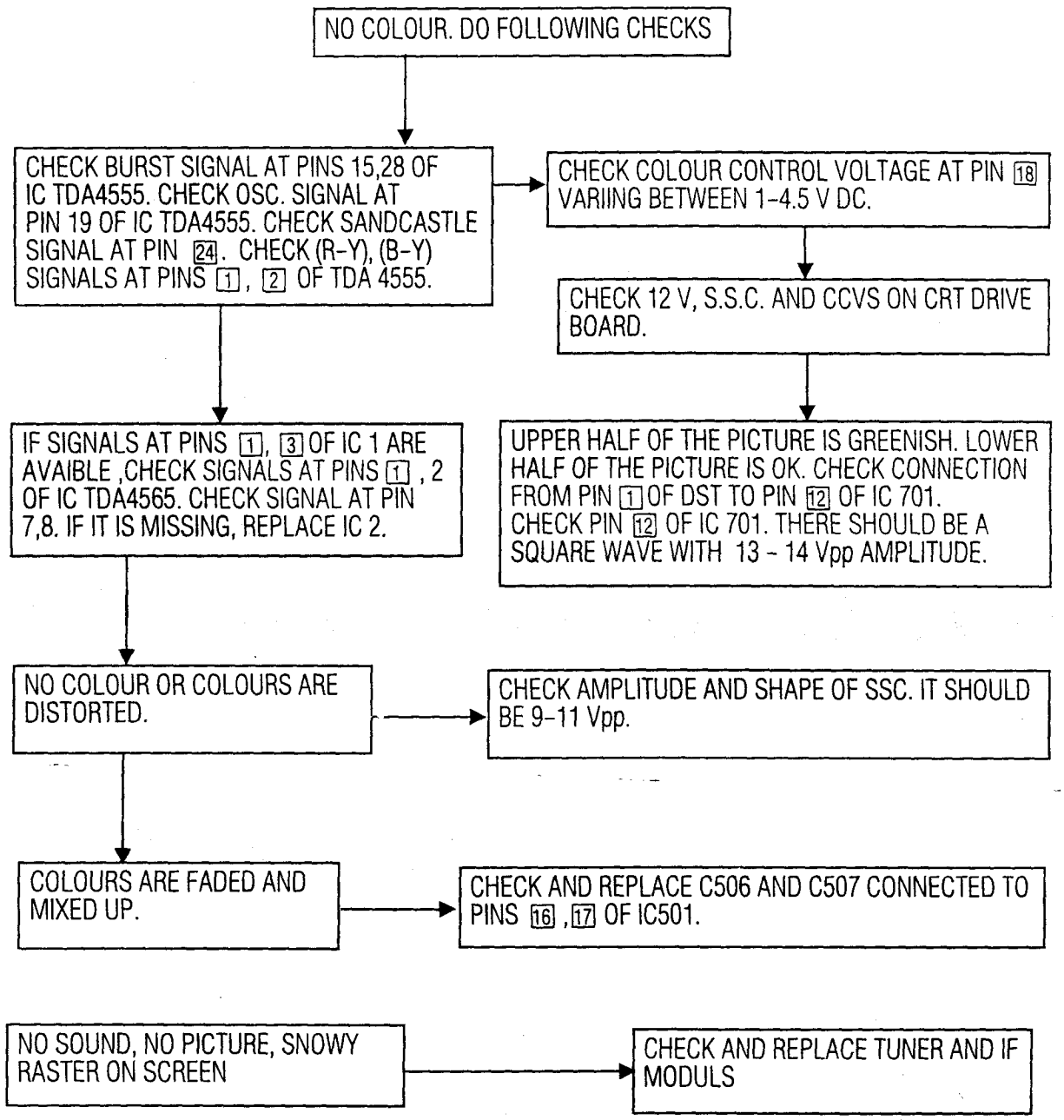

THERE IS NO HOR. OSCILLATOR SIGNAL OUTPUT AT IC701 TEA2029. +12V IS PRESENT.
MAIN ISCILLATOR IS OUT OF FUNCTION.
IF D701 DIODE REMOVED FROM PIN 28. HOR. OSCILLATOR SIGNAL IS APPEARING AT PIN [10].
THERE IS NO 500 KHz OSCILLATOR SIGNAL AT PINS [17], [18], [19] OF IC701. CHECK AND REPLACE R733, R731, Q701, R727, C713.
IF IC701 IS OK, CHECK AND REPLACE R704, C702.
NOT OK
CHECK VERTICAL OSCILLATOR, VERTICAL OUTPUT AND 17.5V CIRCUITS.
VERTICAL LINEARITY DISTORTION. CHANGE RESISTOR R717, R721, R722 CONNECTED TO PIN [5] OF IC701 WITH METAL FILM REZISTORS WITH % 2 TOLERANCE.
CHECK VERTICAL SIGNAL OUTPUT 4.5Vpp AT PIN [4] OF IC701. IF OK. CHECK AND REPLACE D704, T701, C707
SET IS PRODUCING A NOISE.
THERE IS NO HOR. AND NO VERTICAL SENCRONISATION
REPLACE RESISTOR R736 ON DY. CHECK. AND REPLACE COMPONENTS CONNECTED TO PINS [1], [2], [3], OF IC701. CHECK 200V DC.
CHECK AND REPLACE L804, C707, TR802
CHECK PIN 27 OF IC 701. IF THERE IS CCVS SIGNAL, REPLACE IC701.
SANDCASTLE SIGNAL IS DISTORTED AND PICTURE IS SHIFTED. CHECK 55Vpp SIGNAL AT PIN [1] OF DST TRANSFORMER. CHECK AND REPLACE R703 AND C704.
NO PICTURE, BUT RAINBOW COLOURS ON SCREEN. CHECK AND REPLACE COMPONENTS R734, D704, R730, R714, R712, C719, C704, R703 WHICH ARE CONNECTED TO PINS [1] - [5] OF IC 701.
TV SET IS NORMAL DURING TV RECEPTION. TV SCREEN IS BLANK WHEN OPERATING TV WITH VTR ON PAUSE/STILL, REWIEV-CUE AND FF MODES. REPLACE IC701.
PICTURE IS SHIFTED TO THE LEFT SIDE, AFTER APPR ONE HOUR OPERATION. CHECK AND REPLACE C715, R728, R729.
PICTURE IS NORMAL, SOUND HAS DISTORTION. REPLACE C710 CONNECTED TO PIN [25] OF IC701.

IMPORTANT NOTICE: NO PICTURE BUT RAINBOW APPEARANCE ON SCREEN.

IF ONE OF D704 T701 AND C707 IS SHORT OR R703 IS OPEN DY WILL WARM UP AND BREAK CRT NECK.


THERE ARE COLOURED LINES AT UPPED EDGE OF THE SCREEN, IF VERTICAL AMPLITUDE IS INCREASED WITH P703. OSCILLATOR PREQUENCY CAN BE HEARD.
CHECK AND REPLACE T701, D704 WHICH ARE CONNECTED TO PIN 4 OF IC701.
PICTURE HAS DISTORTION AND IS FLICKERING. HORIZONTAL LINES ARE SEPARATED.
CLEAN THE GAP BETWEEN PINS 16 - 17 OF IC701 WITH ALCOHOL. CHECK AND REPLACE C712, C711.
AT MAX VOLUME VERTICAL AMPLITUDE OF THE PICTURE DECREASES. SAME EFFECT IS OBSERVED AT ZAPPING.
CHECK AND REPLACE R121 AND 17V RECTIFIER DIODE D110. IF DEFECT REMAINS SAME REPLACE DST. CHECK AND REPLACE R815 22R.
HORIZONTAL LINES ARE SCROLLING.
CHECK AND REPLACE Q701, C723. IF NOT OK. CHECK AND REPLACE C703, R734,C719

# ⑩
# COLOUR DECODER DEFECTS


NO COLOUR. DO FOLLOWING CHECKS
CHECK BURST SIGNAL AT PINS 15,28 OF IC TDA4555. CHECK OSC. SIGNAL AT PIN 19 OF IC TDA4555. CHECK SANDCASTLE SIGNAL AT PIN 24. CHECK (R-Y), (B-Y) SIGNALS AT PINS 1, 2 OF TDA 4555.
CHECK COLOUR CONTROL VOLTAGE AT PIN 18 VARIING BETWEEN 1-4.5 V DC.
CHECK 12 V, S.S.C. AND CCVS ON CRT DRIVE BOARD.
IF SIGNALS AT PINS 1, 3 OF IC 1 ARE AVAIBLE ,CHECK SIGNALS AT PINS 1 , 2 OF IC TDA4565. CHECK SIGNAL AT PIN 7,8. IF IT IS MISSING, REPLACE IC 2.
UPPER HALF OF THE PICTURE IS GREENISH. LOWER HALF OF THE PICTURE IS OK. CHECK CONNECTION FROM PIN 1 OF DST TO PIN 12 OF IC 701. CHECK PIN 12 OF IC 701. THERE SHOULD BE A SQUARE WAVE WITH 13 - 14 Vpp AMPLITUDE.
NO COLOUR OR COLOURS ARE DISTORTED.
CHECK AMPLITUDE AND SHAPE OF SSC. IT SHOULD BE 9-11 Vpp.
COLOURS ARE FADED AND MIXED UP.
CHECK AND REPLACE C506 AND C507 CONNECTED TO PINS 16 ,17 OF IC501.
NO SOUND, NO PICTURE, SNOWY RASTER ON SCREEN
CHECK AND REPLACE TUNER AND IF MODULS

## WIRING DIAGRAM

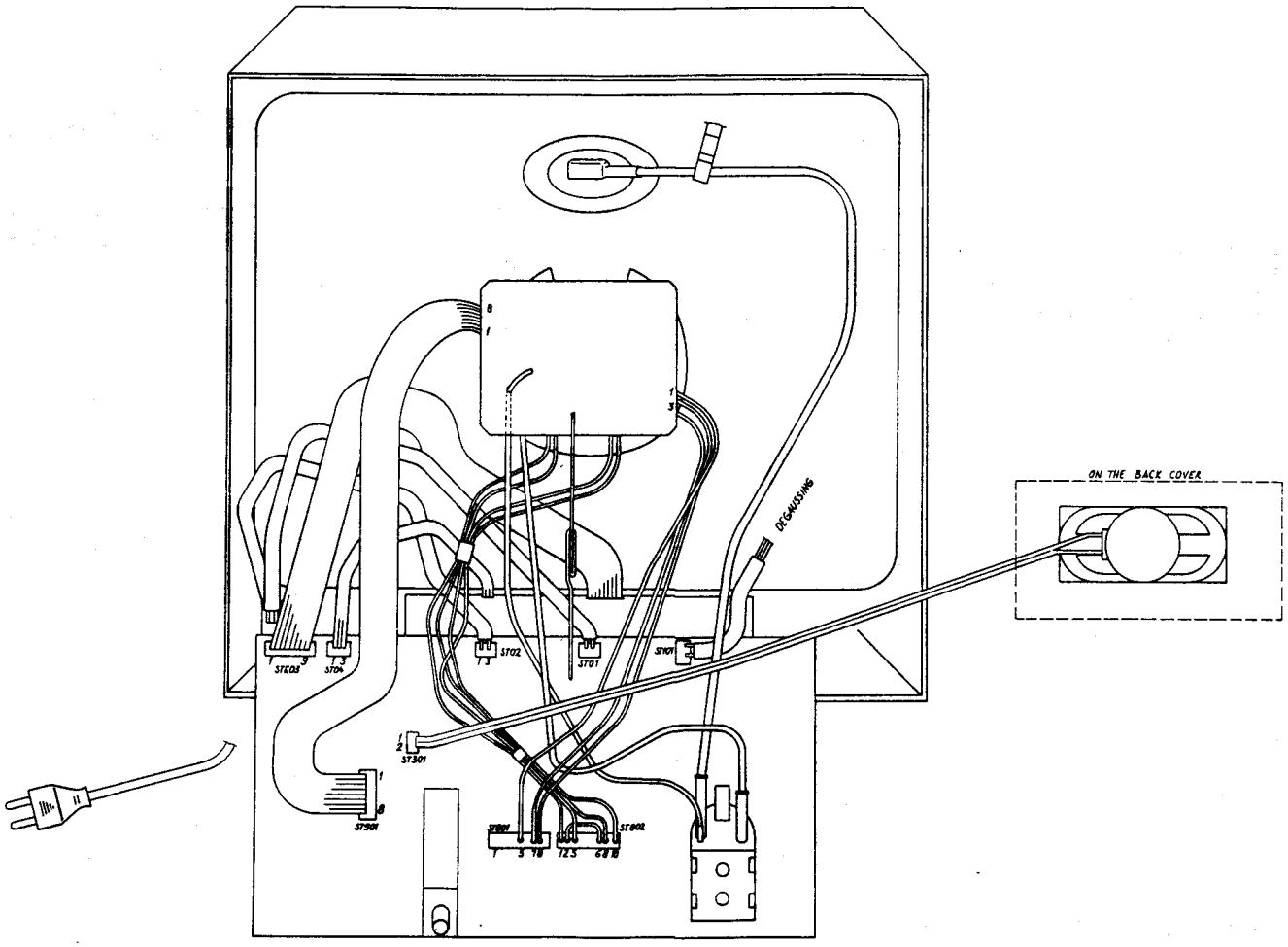
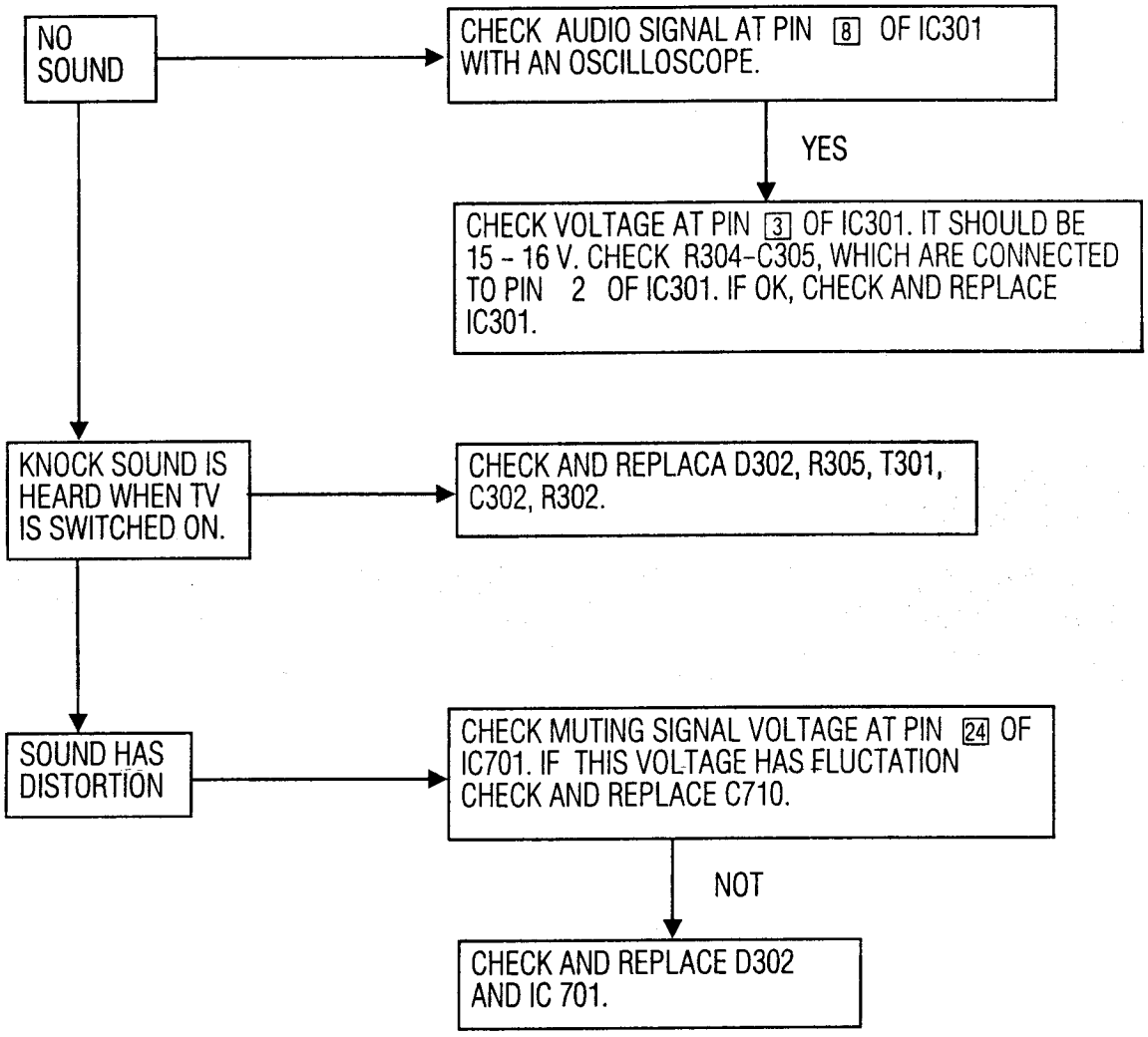



Figure 5

# ⑬
# SOUND CIRCUIT DEFECTS

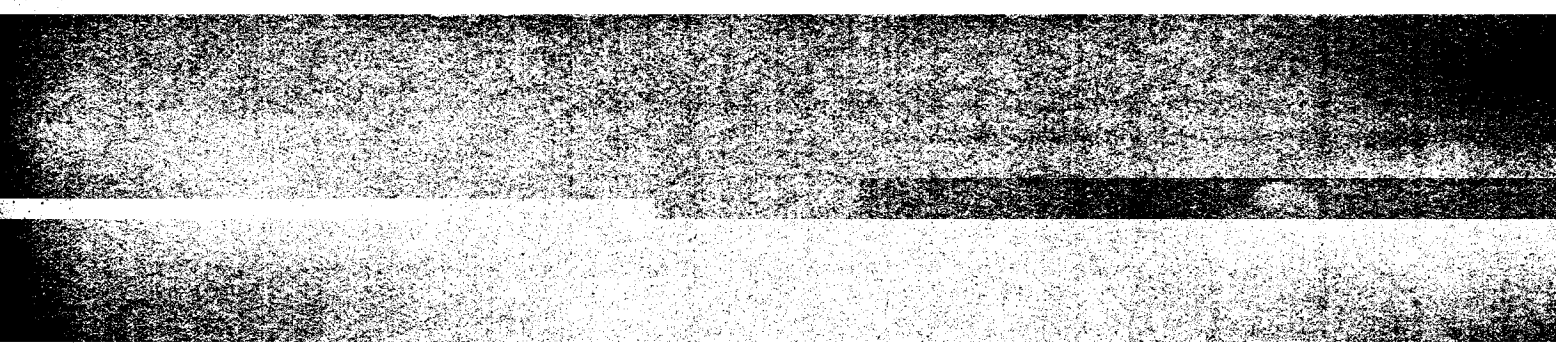

NO SOUND
CHECK AUDIO SIGNAL AT PIN [8] OF IC301 WITH AN OSCILLOSCOPE.
YES
CHECK VOLTAGE AT PIN [3] OF IC301. IT SHOULD BE 15 - 16 V. CHECK R304-C305, WHICH ARE CONNECTED TO PIN 2 OF IC301. IF OK, CHECK AND REPLACE IC301.
KNOCK SOUND IS HEARD WHEN TV IS SWITCHED ON.
CHECK AND REPLACA D302, R305, T301, C302, R302.
SOUND HAS DISTORTION
CHECK MUTING SIGNAL VOLTAGE AT PIN [24] OF IC701. IF THIS VOLTAGE HAS FLUCTATION CHECK AND REPLACE C710.
NOT
CHECK AND REPLACE D302 AND IC 701.

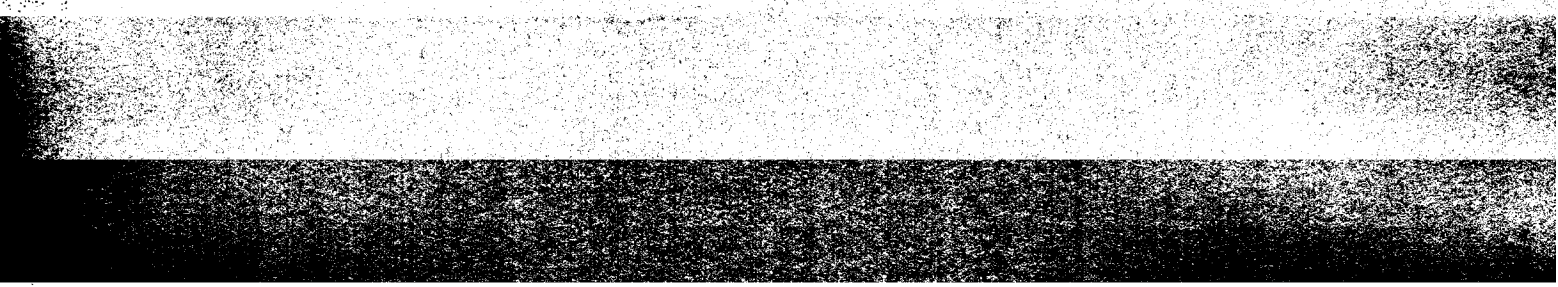
# SPARE PARTS

| PART NUMBER | DISCRIPTION | POSITION |
|---|---|---|
| 010770 | POWER SWITCH ME5-S2 | — |
| 031228 | PERI SOCKET | ST502 |
| 031960 | CRT SOCKET (B10227 TYPE) | — |
| 038905 | POWER CORD L=2400 | — |
| 051581 | DST AT2 90 | TR802 |
| 051583 | LINE FILTER 27UH | L101 |
| 051584 | COIL H-AMPL | L801 |
| 051585 | COIL H—LIN | L802 |
| 051587 | DRIVER TRANSFORMER | TR801 |
| 051609 | SMPS AT2 90 II | TR101 |
| 051610 | COIL CHOKE VERTICAL 500UH | L804 |
| 052495 | COIL ANTENNA SW | L201 |
| 053498 | COIL 1.2UH | L803 |
| 053499 | COIL 7UH | — |
| 053500 | COIL 10UH K | L106 L410 |
| 053501 | COIL 330UH | L502 |
| 053502 | COIL 22UH | L501 |
| 053505 | FILTER SFE5.5MC | F204 |
| 053506 | COIL DEMOD | F203 |
| 053508 | COIL TPC 5.5MC | F202 |
| 053511 | DELAY LINE 5DL145 | DL401 |
| 053512 | COIL 8128-A3753 | FI205 FI406 FI407 FI408 FI409 |
| 053513 | COIL CHROMA 4.4MHH | FI404 |
| 053523 | COIL A4449 | FI401 |
| 053525 | COIL 2K843EG | FI403 |
| 053529 | COIL 100UH | DR402 |
| 053547 | COIL 3UH | L301 L302 |
| 053600 | COIL DISKR. 6.5MHZ | F202 |
| 053601 | COIL DISKR. 5.5 MHZ | F205 |
| 053633 | COIL 10UH (RAD) | DR401 L202 |
| 054230 | FUSE 3.15AT | FU101 |
| 054275 | FUSE 1.25A (DELAY) | FU102 |
| 056065 | SAW FILTER OFW K2950 | F201 |
| 056066 | CER.FILTER TPS 6.5MB | FI207 |
| 056067 | CER.FILTER SFE6.5MC | FI208 |
| 056736 | CRT SS 5109B22TC-DSE-1992JL | — |
| 056946 | CHRYSTAL 12MHZ | Q901 |
| 056947 | CHRYSTAL 500KHZ | Q701 |
| 056955 | CRYSTAL 8.8MHZ | Q401 |
| 100224 | CFR 22R J 1/4W | R713 |
| 100473 | CFR 47R J 1/4W | R106 R113 |
| 100684 | CFR 68R J 1/4W | R403 |
| 100751 | CFR 75R J 1/4W | R516 |
| 101106 | CFR 100R J 1/4W | RI901 R114 R945 R947 R924 |
| 101154 | CFR 150R J 1/4W | R944 |
| 101223 | CFR 220R J 1/4W | R109 R731 |
| 101274 | CFR 270R J 1/4W | R801 R802 |
| 101395 | CFR 390R J 1/4W | R1203 |
| 101470 | CFR 470R J 1/4W | R733 |
| 101562 | CFR 560R J 1/4W | R934 R935 R936 |
| 101683 | CFR 680R J 1/4W | R207 |
| 101820 | CFR 820R J 1/4W | R1202 |
| 102101 | CFR 1K J 1/4W | R104 R705 R740 R448 R210 R923 |
| 102126 | CFR 1.2K J 1/4W | R1236 R1237 R444 |
| 102157 | CFR 1.5K J 1/4W | R1207 R1209 R1211 R408 R422 |
| 102189 | CFR 1.8K J 1/4W | R1201 |
| 102198 | CFR 1.3K J 1/4W | R120 |
| 102227 | CFR 2.2K J 1/4W | R942 R943 R424 |
| 102338 | CFR 3.3K J 1/4W | R1225 R216 R217 |
| 102479 | CFR 4.7K J 1/4W | R117 R732 R902 R904 R906 R908 R910 R919 R915 R946 R215 |

| PART NUMBER | DISCRIPTION | POSITION |
|---|---|---|
| 102563 | CFR 5.6K J 1/4W | R940 |
| 102685 | CFR 6.8K J 1/4W | R110 R112 |
| 102825 | CFR 8.2K J 1/4W | R909 |
| 103116 | CFR 10K J 1/4W | R901 R903 R905 R907 R911 R93 R939 R439 |
| 103155 | CFR 15K J 1/4W | R926 R927 R928 R929 R930 R93 R932 R933 R419 R421 |
| 103224 | CFR 22K J 1/4W | R306 R509 R703 |
| 103273 | CFR 27K J 1/4W | R938 |
| 103475 | CFR 47K J 1/4W | R1222 R1229 R922 |
| 103561 | CFR 56K J 1/4W | R510 R511 R512 R941 |
| 104110 | CFR 100K J 1/4W | R920 R921 |
| 104151 | CFR 150K J 1/4W | R925 |
| 104185 | CFR 180K J 1/4W | R1219 |
| 104222 | CFR 220K J 1/4W | R1221 |
| 104273 | CFR 270K J 1/4W | R1220 |
| 104332 | CFR 330K J 1/4W | R1234 |
| 104470 | CFR 470K J 1/4W | R807 |
| 105106 | CFR 1M J 1/4W | R722 |
| 106100 | CFR 10M J 1/4W | R916 R917 |
| 109106 | CFR 1R J 1/4W | R304 |
| 109224 | CFR 2.2R J 1/4W | R701 |
| 109473 | CFR 4.7R J 1/4W | — |
| 1113222 | CFR 22K J 1/4W | R1213 R1214 R1215 |
| 113270 | RMO 27K J 2W | R115 R61 |
| 113330 | RMO 33K J 2W | R105 |
| 113477 | RMO 47K J 2W | R118 R1208 R1210 R1212 |
| 114330 | RMO 330K J 1.5W | R112 |
| 114820 | RMO 820K J 1.5W | R111 |
| 115473 | RM 4.7M %1. 1W | R102 R103 |
| 119475 | RMO 4.7R J 1.5W | R715 |
| 121153 | RW 150R J 2W | R803 |
| 122112 | RW 1K J 1.5W | — |
| 129109 | RW .1R J .75W | R121 R122 R123 R808 R1225 |
| 129273 | RW 2.7R J 4W | — |
| 129486 | RW 4.7R J 11W | R805 |
| 131224 | R—VAR 220R | P401 |
| 131250 | R-VAR 250R | P703 |
| 132129 | R-POT 1K | P1201 P1202 P1203 |
| 132252 | R-VAR 2.5K (V) | P101 |
| 132253 | R-VAR 2.5K (H) | P702 |
| 132475 | R-VAR 4.7K | P501 |
| 133147 | R-VAR 10K | P201 |
| 133253 | R-VAR 25K | P701 |
| 134234 | R-POT 220K | P1204 P1205 |
| 154213 | PTC DEGAUSSING COIL 98009 | R124 |
| 154216 | 4.7R S234 | R101 |
| 200222 | CC 22PF J 100V | C434 C437 |
| 200331 | CC 33PF J 63V | C906 C907 C920 C1210 |
| 200472 | CC 47PF J 63V | C913 C915 |
| 200473 | CC 47PF J 63V | C501 C1203 C1203 |
| 200564 | CC 56PF J 63V | C1209 |
| 200682 | CC 68PF | C427 C441 |
| 201102 | CC 100PF J 63V | C914 |
| 201104 | CC 100PF J 63V | C117 C924 C210 |
| 201105 | CC 100PF K 63V | C428 C431 |
| 201124 | CC 120PF K 63V | C408 C435 C442 C446 |
| 201151 | CC 150PF J 63V | C802 |
| 201152 | CC 150PF | C412 |
| 201181 | CC 180PF K 63V | C714 C430 C439 |
| 201222 | CC 220PF | C404 |

| PART NUMBER | DISCRIPTION | POSITION |
|---|---|---|
| 201223 | CC 220PF 2KV | C121 C809 |
| 201331 | CC 330PF K 63V | C433 |
| 201332 | CC 330PF J 63V | C1212 C1213 C1214 |
| 201391 | CC 390 PF | C 407 |
| 201471 | CC 470PF 2KV | C807 |
| 201472 | CC 470PF K 63V | C438 C440 |
| 201560 | CC 560PF K 63V | C306 |
| 202105 | CC 1NF 1KV | C135 C136 C137 C138 |
| 202106 | CC 1NF 100V | CR701 C713 CT102 CT103 C720 C721 C722 |
| 204106 | CC 100NF 63V | C724 |
| 209680 | CC 6.8PF J 63V | C921 |
| 213684 | C-PEM 68NF 250V | C133 |
| 240470 | TAN.CAP. 4.7UF M 10V | C918 C919 |
| 250105 | EC 1UF 100V | C112 C502 C417 C424 C425 C214 C216 C217 |
| 251115 | EC 10UF 25V | C503 C717 C905 C910 C912 C201 C218 |
| 251116 | EC 10UF | C401 |
| 251225 | EC 22UF16V | C516 |
| 251478 | EC 47UF 16V | C134 C1215 C419 |
| 251479 | EC 47UF 25V | C110 |
| 251480 | EC 47UF 250V | C122 C123 C810 |
| 252112 | EC 100UF 16V | C444 |
| 252113 | EC 100UF 25V | C304 |
| 252152 | EC 150UF 385V | C103 |
| 252225 | EC 220UF 25V | C801 |
| 252476 | EC 470UF 25V | C301 C701 |
| 252477 | EC 470UF 40V | C125 C126 |
| 253108 | EC 1000UF 25V | C131 |
| 259223 | EC 2.2UF 63V | C127 C130 |
| 259477 | EC 4.7UF 40V | C505 C712 C1207 C207 |
| 259478 | EC 4.7UF 250V | C1217 |
| 260140 | C-TRIM 332PF | C420 |
| 271220 | C-MFP 220PF 1600V | C116 |
| 271683 | C-STRY 680PF %2 160V | — |
| 272101 | C-PEM INF 63V | C445 |
| 272151 | C-PEM 1.5NF K 63V | C713 |
| 272221 | C-PEM 2.2NF K 63V | C309 C310 C410 C411 C413 |
| 272330 | C-PEM 3.3NF K 63V | C307 C703 |
| 272471 | C-PEM 4.7NF K 63V | C111 C113 C91 C211 |
| 272472 | C-PEM 4.7NF K 400V | C719 |
| 272681 | C-PEM 6.8NF K 63V | C1216 C414 C422 |
| 273102 | C-PEM 10NF K 63V | C504 C506 C507 C508 C509 C510 C511 C512 C925 |
| 273103 | C-PPM 10NF K 250V | C808 |
| 273104 | C-PPM 10NF J 1500V | C813 |
| 273108 | C-POL 10NF K 400V | C517 C518 C519 |
| 273110 | C-MKP 10NF K 1000V | C1219 |
| 273150 | C-PEM 15NF K 63V | C711 |
| 273222 | C-PEM 22NF K 250V | C909 |
| 273224 | C-PEM 22NF K 63V | C710 C415 C421 C203 C212 C213 |
| 273331 | C-PPM 33NF J 1000V | C115 |
| 273471 | C-PEM 47NF K 63V | C803 C423 C432 |
| 273474 | C-PEM 47NF K 250V | C1218 |
| 273681 | C-PEM 68NF K 63V | C715 |
| 274104 | C-PEM 100NF K 63V | C305 C901 C1211 C443 C202 C205 C206 C209 C215 C219 |
| 274106 | C-PEM 100NF K 250V | C1202 |
| 274222 | C-PEM 220NF K 63V | C909 |
| 274224 | C-PEM 220NF 250V | C710 |
| 274330 | C-PEM 330NF J 250V | C804 |
| 274332 | C-PEM 330NF K 63V | C418 C429 |
| 274470 | C-PEM .47UF J 200V (MPP) | C805 |
| 274471 | C-PEM 470NF K 63V | C705 C208 |
| 274680 | C-PEM 680NF 250V | C101 |
| 275100 | C-PPM 1UF J 250V | C707 |
| 306305 | DIODE BA157 | D704 |
| 302289 | DIODE 1N4148 | D101 D102 D104 D501 D503 D901 D902 D201 |
| 302626 | DIODE SFH205 IR | D904 |
| 302638 | DIODE BY299 | D109 D801 |
| 302939 | DIODE 1N4002 | D301 D701 |
| 302947 | DIODE 1N4004 | D1214 |
| 302984 | DIODE BYW72 | D110 D111 D112 |
| 303085 | DIODE BZX55-C30 | D61 |
| 303086 | DIODE Z. BZX85-C6V2 | D105 |
| 303087 | DIODE C2540 BRIDGE | GR101 |
| 303093 | DIODE BA159 | D103 |
| 303104 | DIODE BZX83 C4V7 | D1208 |
| 303900 | LED ROT | D903 |
| 400338 | TRN BF422 | T1203 T1205 T1207 T1211 |
| 400339 | TRN BF423 | T1208 T1209 T1210 |
| 400987 | TRN BC548 | T301 T901 T902 T903 T905 T906 T907 T401 T404 T405 |
| 400989 | TRN BC558 | T1201 T201 T203 T904 |
| 400990 | TRN BF869G | T1202 T1204 T1206 |
| 400991 | TRN BUZ90A | T101 |
| 400993 | TRN BC635 | T801 |
| 401003 | TRN S2055F | T802 |
| 410015 | THRY SCRESM740 | T701 |
| 451463 | IC TDA4605 | IC 101 |
| 451464 | IC TDA5931-4 | IC 201 |
| 451465 | IC SDA 2526 | IC902 |
| 451467 | IC TBA121 | IC202 |
| 451468 | IC TDA1037 | IC301 |
| 451469 | IC TDA4060 | IC903 |
| 451508 | IC TDA4580 | IC501 |
| 451509 | IC UPD6142 | IC904 |
| 451510 | IC TEA2029 | IC701 |
| 451512 | IC TDA4565 | IC402 |
| 451516 | IC TDA4555 | IC401 |
| 451517 | IC TDB7805CT (T0220CASE) | T103 |
| 451518 | IC LM317T (T0220CASE) | T102 |
| 451765 | IC SDA20160 | IC901 |
| 500265 | WASHER PLST 6*3*2.5 | — |
| 50S158 | PAL/SECAM PLATE ASSY | — |
| 50S164 | CRT PLATE ASSY | — |
| 50S221 | BRACKET LED | — |
| 50S305 | HEAT SINK HORIZONTAL | — |
| 50S306 | HEAT SINK REGULATOR AT2 | — |
| 50S307 | HEAT SINK SOUND AT2 | — |
| 50S308 | HEAT SINK POWER AT2 | — |
| 520304 | SPRING CRT EARTH LEAD | — |
| 52N820 | CIRCUIT DIAGRAM 90 PS/BG | — |
| 52P110 | CHASSIS 20" PS B/G-D/K | — |
| 52P140 | IF B/G-D/K ASSY | — |
| 530307 | CRT EARTHING HOOK | — |
| 571925 | PUSH CATCH NEW TYPE | — |
| 597166 | DEGAUSSING COIL 20" | — |
| 597317 | HEAT SINK 2-IC200 | — |
| 60U172 | CONTROL UNIT ASSY | — |
| 60U203 | LENS LED | — |
| 60U805 | STROPOR TOP 20SI-BK00 | — |
| 60U806 | STROPOR BOTTOM 20SI-BK00 | — |
| 60U902 | RUBBER CONTACT-II 6KEY 20SI-BK00 | — |
| 60U903 | RUBBER CONTACT-II 7KEY 20SI-BK00 | — |
| 70P258 | KNOB POWER PAINTED | — |
| 71S320 | NAME PLATE BEK02 D.C 49.9*11.2*0.5 | — |
| 72W205 | BACK COVER | — |
| 72W251 | FRONT COVER | — |
| 72X136 | TUNER TFK 2201 PKC-3x8630 | — |
| 72X261 | CU DOOR PAINTED | — |
| 72X800 | GIFT BOX | — |
| 850107 | SPEAKER FOSTER | — |
| 880187 | R/C HANDSET ASSY BEK0-2 TX | — |





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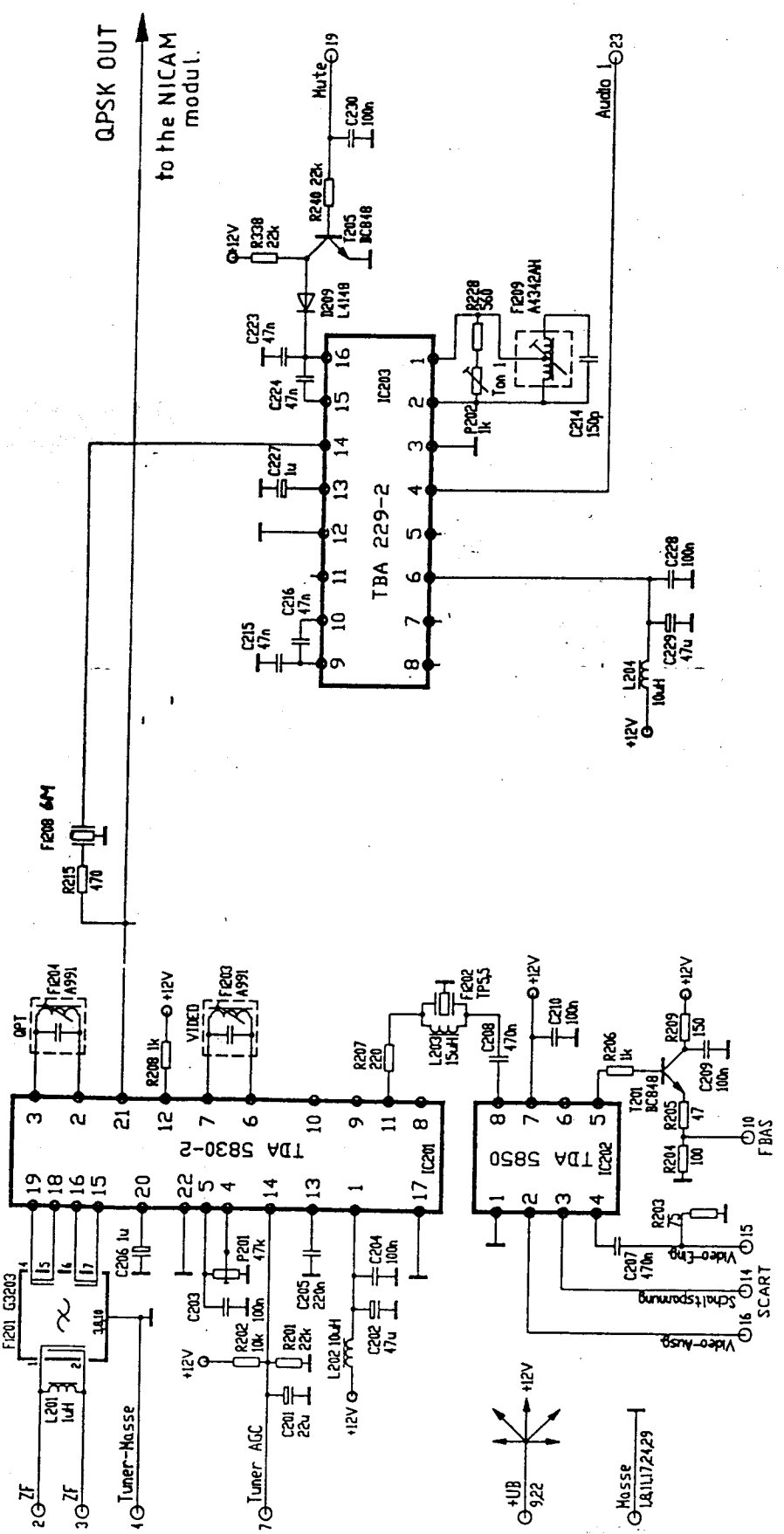
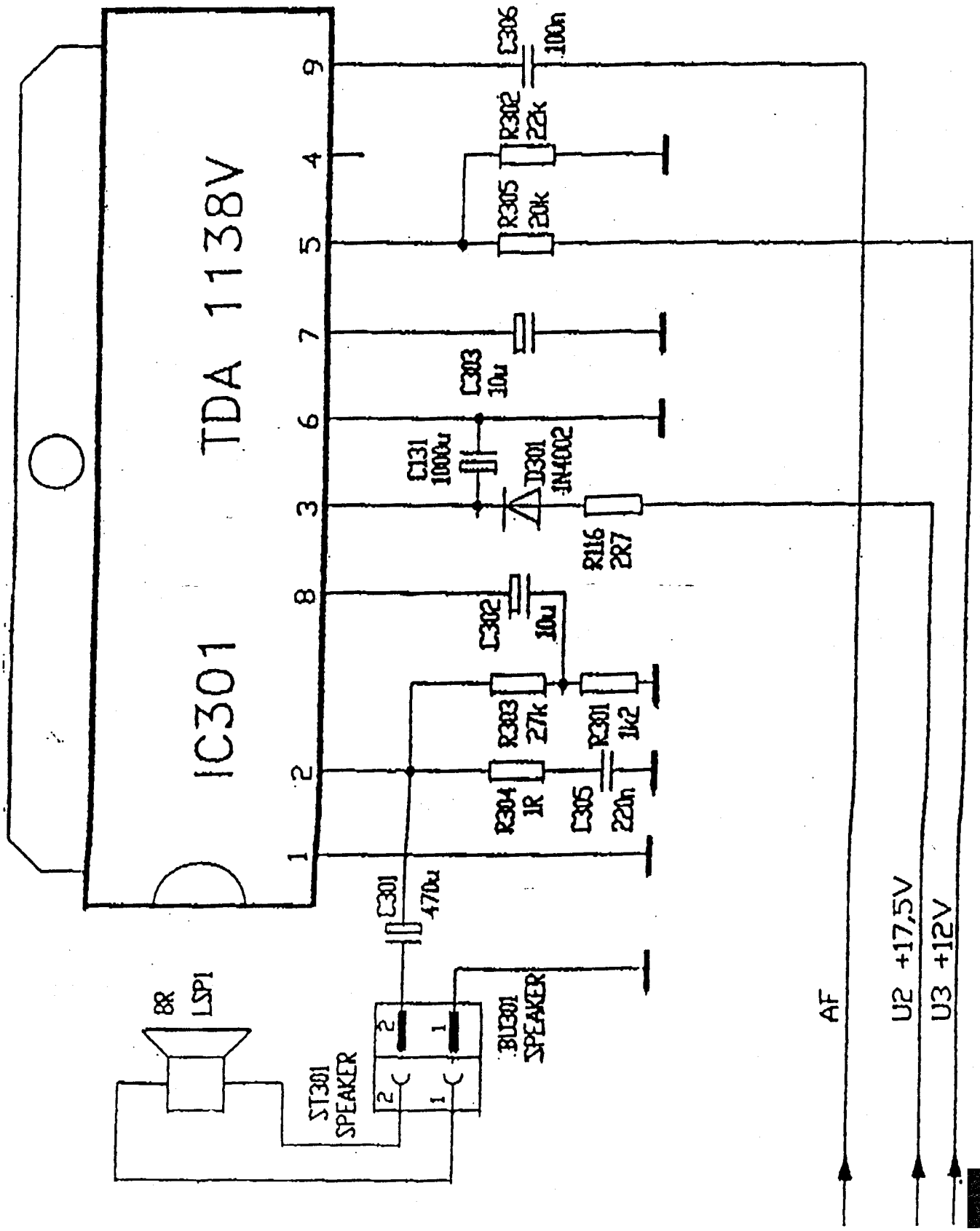
## IF (NICAM)



BEKO

## ALTERNATIVE AUDIO CIRCUITRY FOR 90° 14"-21" CTV'S



# TECHNICAL SPECIFICATIONS

## 1. OPERATING CONDITIONS

| | | |
|---|---|---|
| 1.1 | POWER SUPPLY | 140 TO 265 VAC |
| 1.2 | NOMINAL OPERATING VOLTAGE | 220 VAC |
| 1.3 | TEMPERATURE RANGE | 0 TO 45 DEGREES C |
| 1.4 | HUMIDITY RANGE | YEAR'S MEAN = 75%<br>MAX = 95% |

## 2. RF SECTION

2.1 RECEIVING CHANNELS FOR VHF/UHF BAND

| CCIR | | | | OIRT | | |
|---|---|---|---|---|---|---|
| VHF BAND | | | | VHF | | |
| BAND I | CHANNEL | 2-4 | | Band I | Channel | 1-4 |
| BAND III | CHANNEL | 5-12 | | Band III | Channel | 5–12 |
| CABLE CH | CABLE CH. | 81-99 | (S1-S19)<br>(S20-S41) | Cable Ch. | | S1-S19<br>S20-S41 |
| UHF BAND | | | | UHF | | |
| BAND IV-V | CHANNEL | 21-69 | | Band IV-V | Channel | 21-69 |

| | | | MIN | NOM | MAX | UNIT |
|---|---|---|---|---|---|---|
| 2.2 | GAIN LIMITED SENSITIVITY<br>INPUT SIGNAL LEVEL FOR<br>STANDARD VIDEO OUTPUT VOLTAGE | | | | | |
| | BAND 1/3 | | – | 20 | – | dB ( $\mu$V) |
| | BAND 4/5 | | – | 23 | – | dB ( $\mu$V) |
| 2.3 | NOISE LIMITED SENSITIVITY<br>INPUT SIGNAL LEVEL FOR 30 dB<br>(S+N)/N-RATIO, WEIGHTED, CCIR<br>REC 567 | | | | | |
| | BAND 1/3/4/5 | : | – | 30 | – | dB ($\mu$V) |
| 2.4 | SELECTIVITY HF+IF | | | | | |
| 2.4.1 | IF FREQUENCIES | : | | | | |
| | | | B/G | D/K | | |
| | PICTURE CARRIER | : | 38.9 MHz | 38.9 | | |
| | SOUND CARRIER | : | 33.4 MHz | 32.4 | | |
| | COLOUR CARRIER | : | 34.47 MHz | 34.47 MHz | | |
| 2.5 | VOLTAGE STANDING WAVE RATIO | : | **MIN** | **NOM** | **MAX** | **UNIT** |
| | BAND 1/3 | : | – | 2 | 4 | – |
| | BAND 4/5 | : | – | 2 | 4 | – |
| 2.6 | MAXIMUM INPUT SIGNAL LEVEL | : | | | | |
| | BAND 1/3 | : | 100 dB$\mu$V (MAX) | | | |
| | BAND 4/ | : | 100 dB$\mu$V (MAX) | | | |

## 3. VIDEO OUTPUT SECTION

| | | | MIN | NOM | MAX | UNIT |
|---|---|---|---|---|---|---|
| 3.1 | VIDEO OUTPUT VOLTAGE<br>(measured on cathode with<br>lowest output level, contrast<br>control and drive control at<br>max. | : | 90 | 100 | – | V |
| 3.2 | FREQUENCY RESPONSE | : | | | | |
| a) | INPUT AERIAL STANDARD, HF SIGNAL | : | | | | |
| | STANDARD B/G - D/K | : | –10 | –7 | – | dB |
| b) | INPUT: SCART PIN 20 | | | | | |
| | STANDARD B/G - D/K | : | –8 | –6 | – | dB |

## 4. CHROMA SECTION

| | | | | | | |
|---|---|---|---|---|---|---|
| 4.1 | PAL/SECAM | | | | | |
| 4.1.1 | COLOUR CAPTURE RANGE | : | +–300 | +–500 | – | HZ |
| 4.1.2 | PHASE ERROR OF REFERENCE<br>CARRIER | : | – | +–5 | 10 | DEGRESS |
| 4.1.3 | COLOUR KILLER | : | 30 dB$\mu$V (NOMINAL) | | | |

## 5. SOUND SECTION

| | | | MIN | NOM | MAX | UNIT |
|---|---|---|---|---|---|---|
| 5.1 | SCART OUTPUT | | | | | |
| 5.1.1 | S/N RATIO | : | 40 | 45 | – | dB |
| 5.1.2 | NOISE LIMITED SENSITIVITY | : | 38 db/V (NOMINAL) | | | |
| 5.1.3 | AM SUPRESSION RATIO<br>AM MODULATION=30% | : | 60 db (NOMINAL) | | | |
| 5.1.4 | HARMONIC DISTORTION<br>fm=1 KHZ | : | 10% | | | |
| 5.2 | POWER OUTPUT (at 10% distortion)<br>fm=1 KHz | : | 4.0 Wrms | | | |

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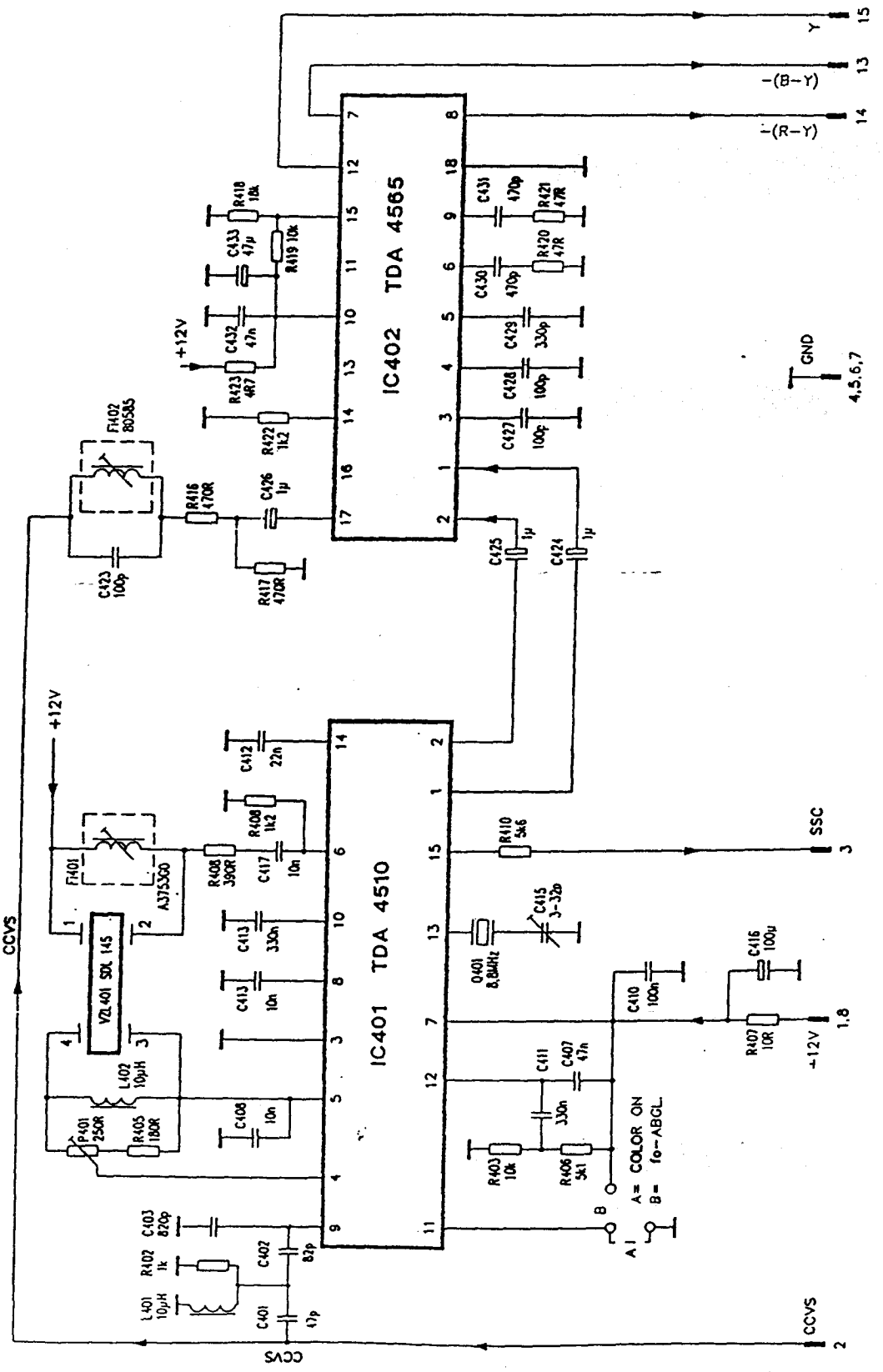
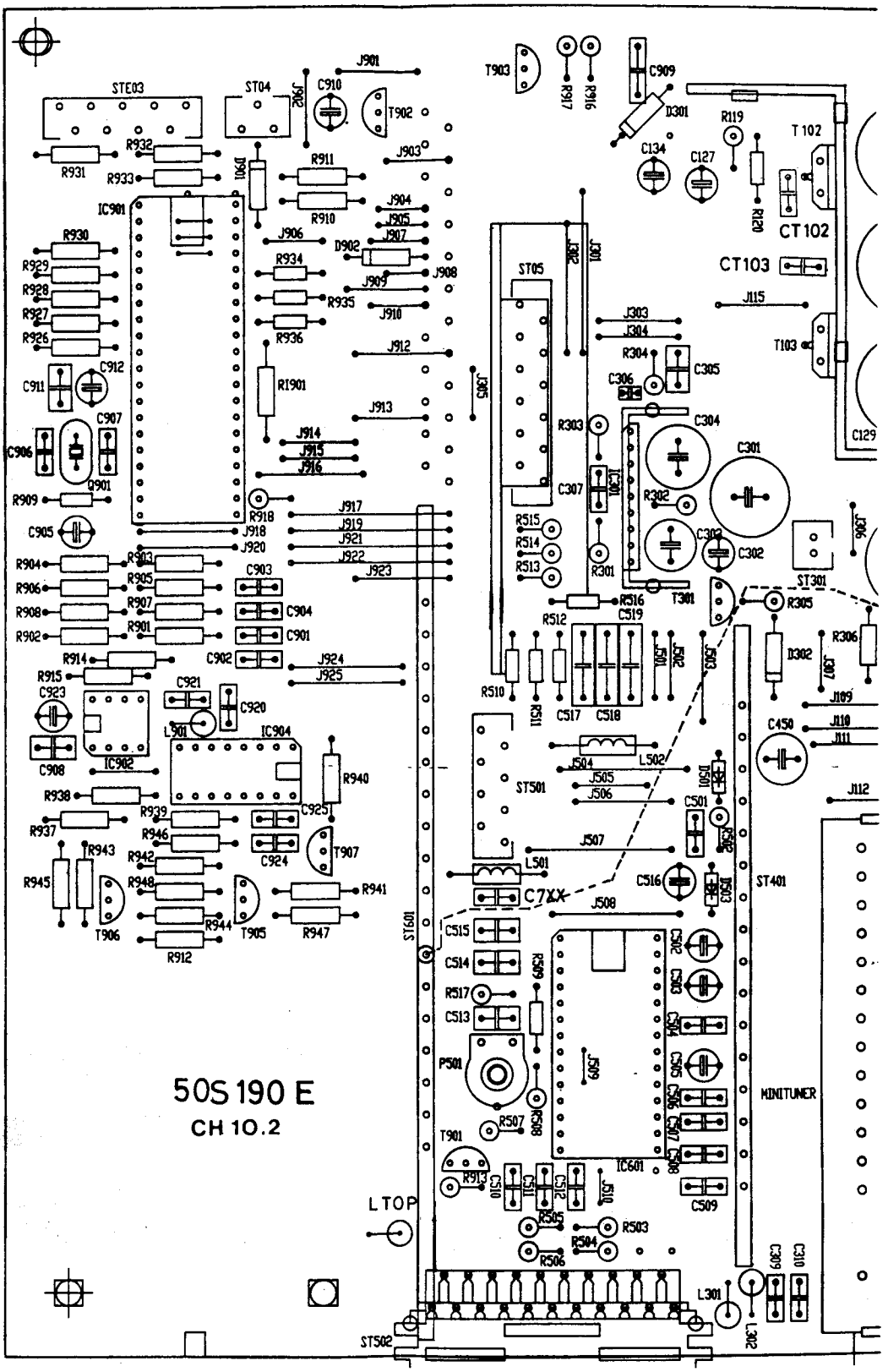
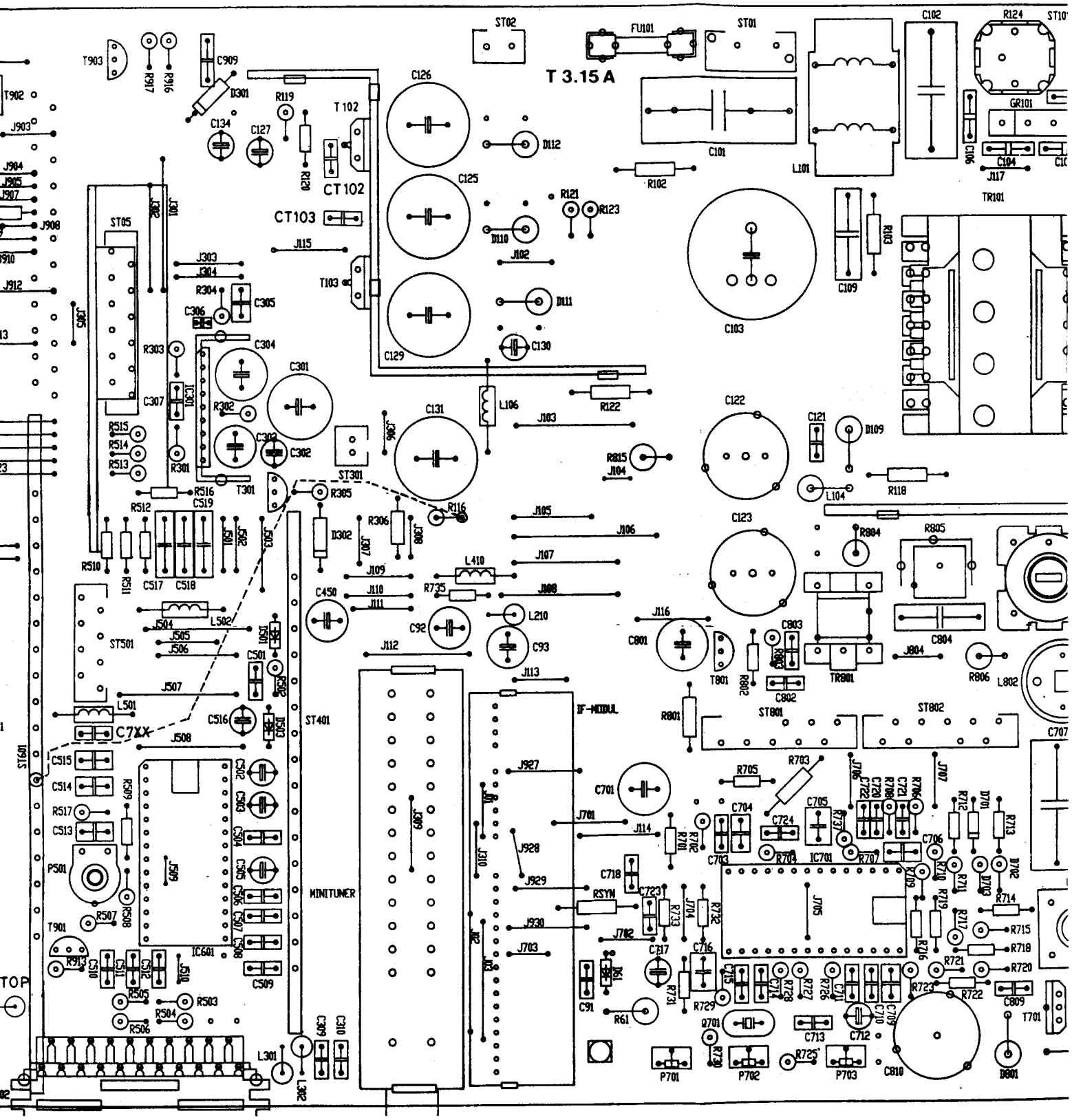
## ALTERNATIVE PAL DECODER

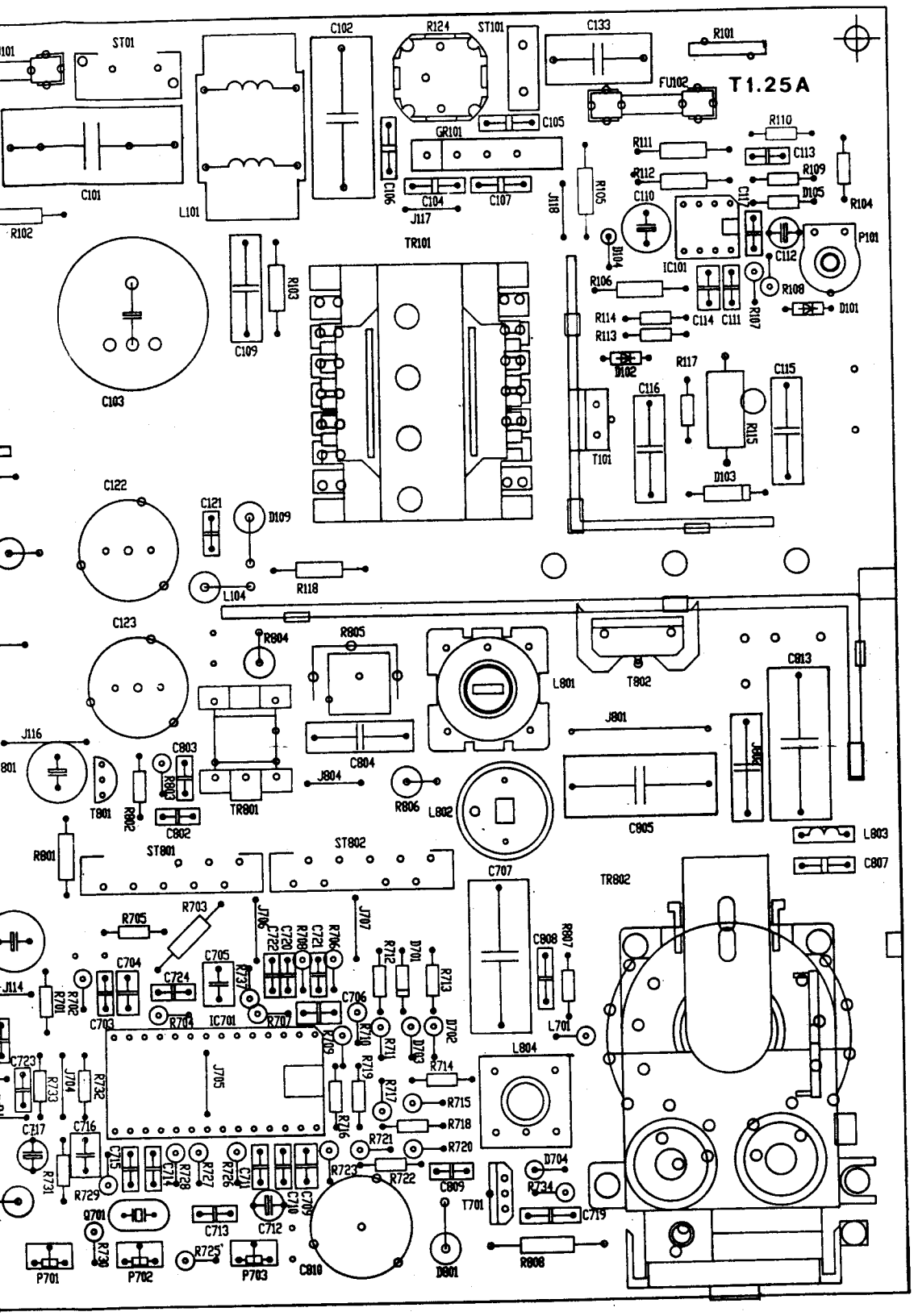


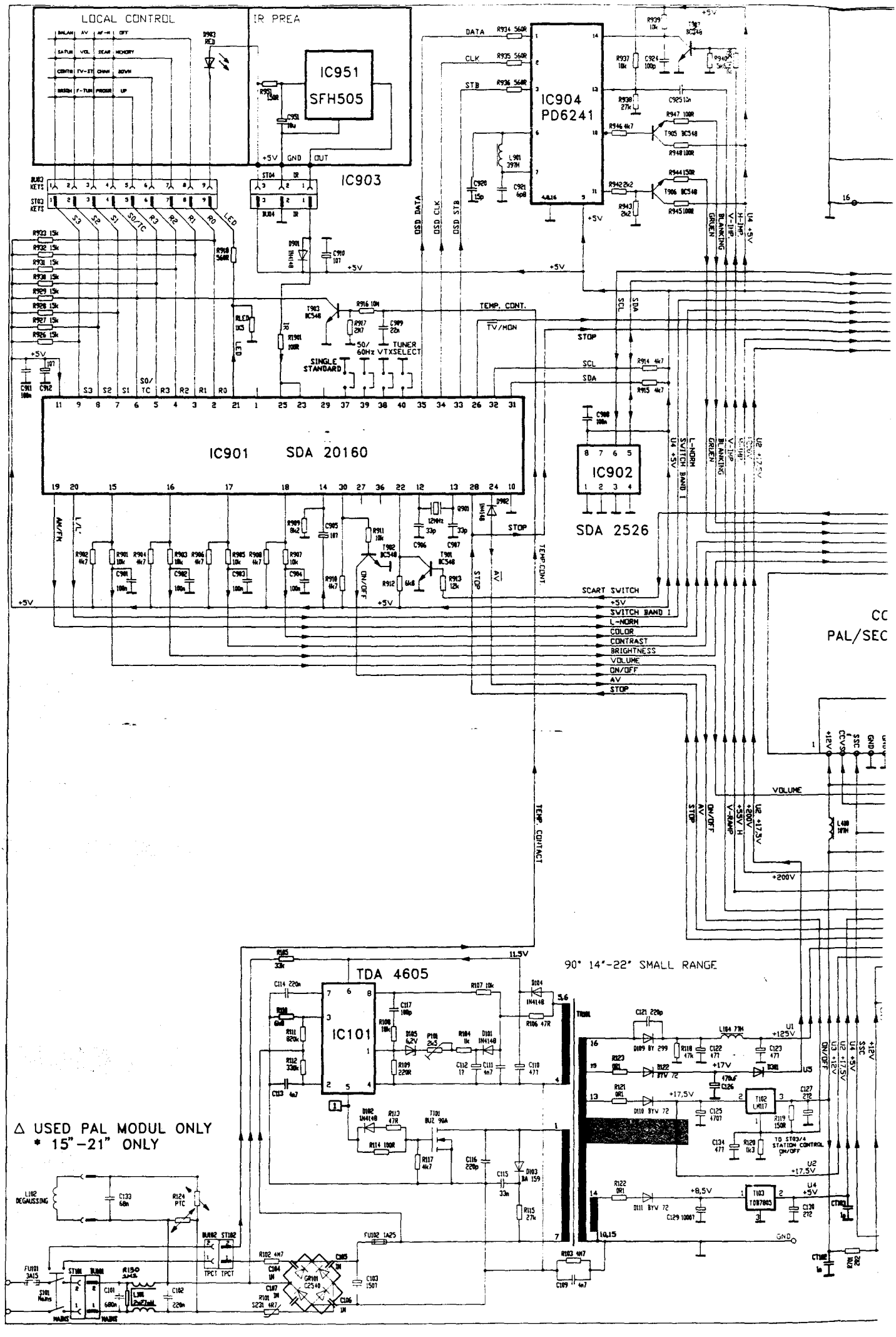

50S190E
CH10.2
MINITUNER
LTOP
C7XX
CT102
CT103
IC901
IC902
IC904
IC601
ST501
ST502
ST601
ST401
ST301
P501
T901
T902
T903
T905
T906
T907
Q901
L301
L302
L501
L502
T301
T102
T103

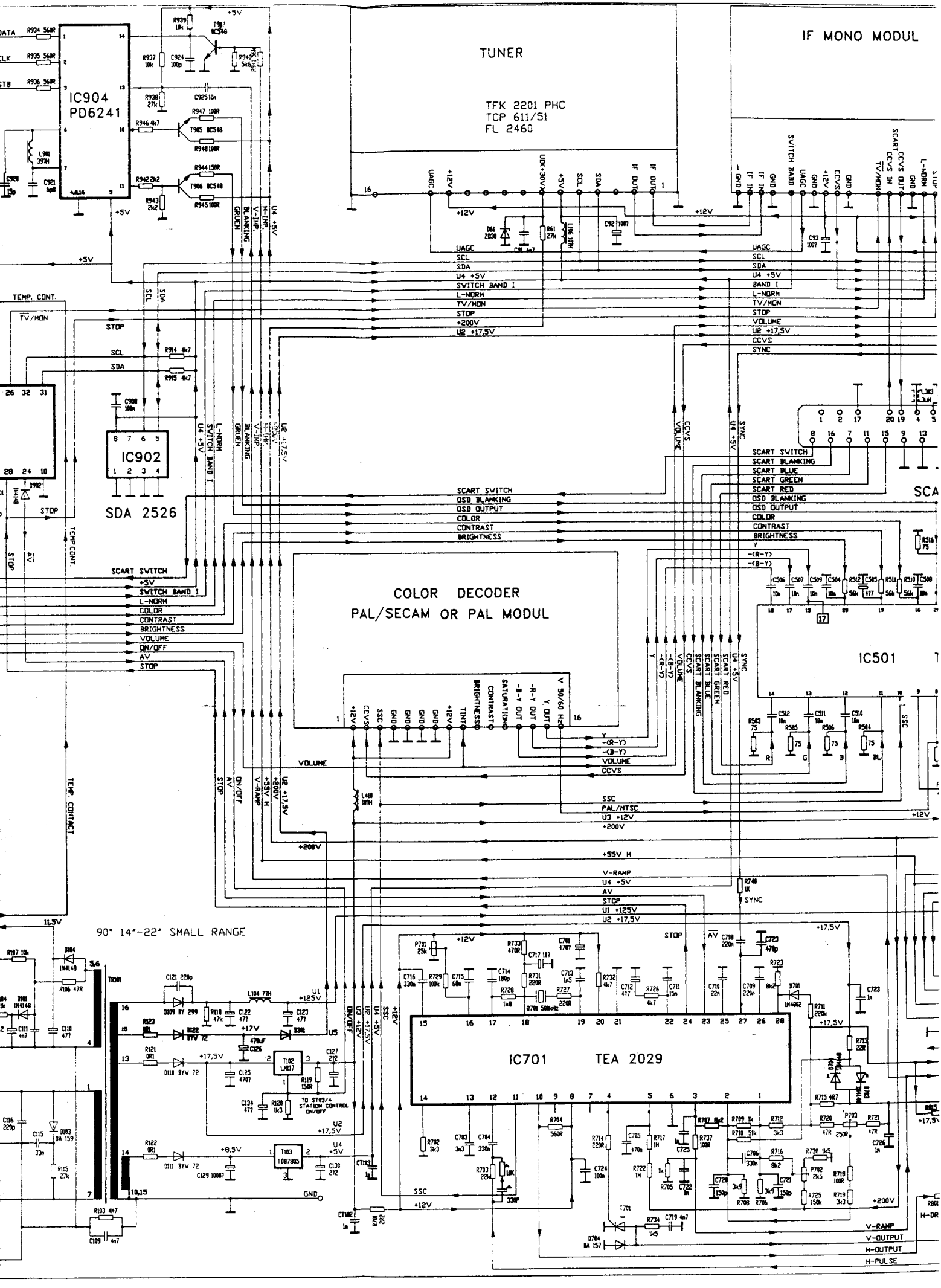
# MAIN CHASSIS 90°

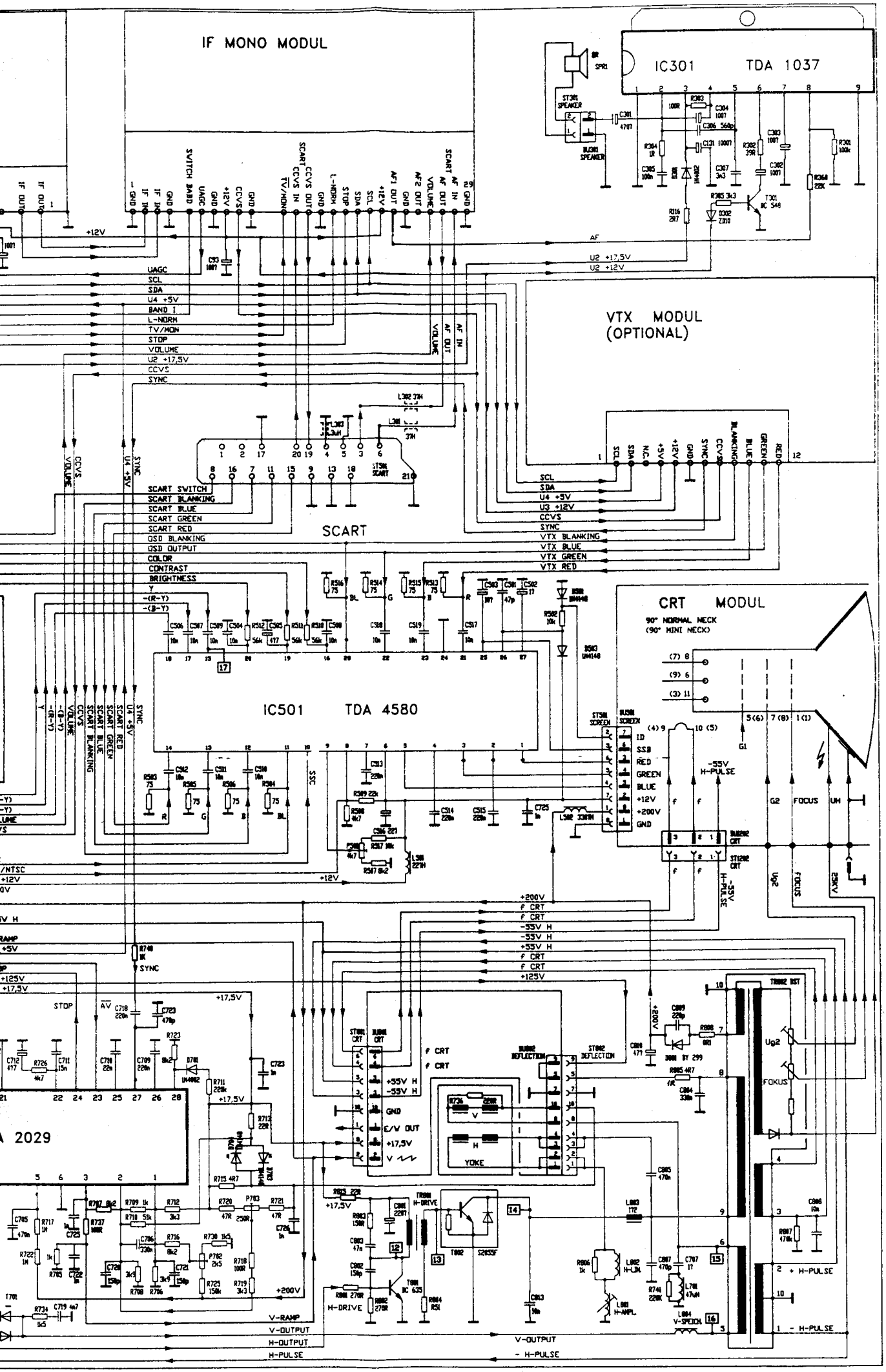


0°

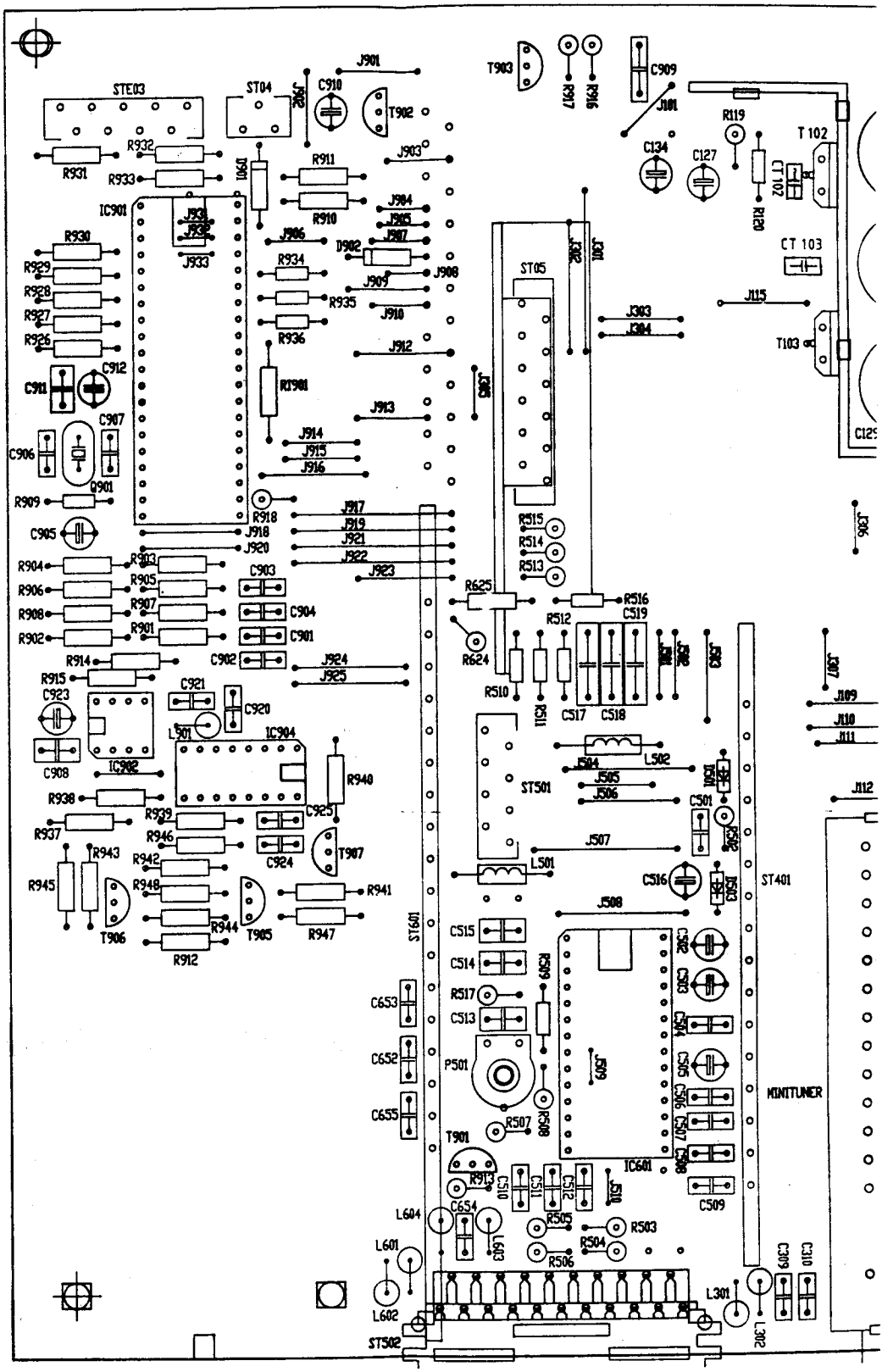

T1.25A
ST01
C102
R124
ST101
C133
R101
FU102
C105
GR101
R110
C113
R111
R112
R109
D105
R104
C101
L101
C106
C104
C107
J117
J18
R105
C110
C112
P101
R102
TR101
D104
IC101
R106
R108
D101
R103
C109
R114
R113
C114
C111
R107
D102
R117
C115
C116
R115
C103
T101
D103
C122
C121
D109
L104
R118
C123
R804
R805
L801
T802
C813
J801
J116
C803
R803
J804
R806
L802
T801
R802
TR801
C802
C805
L803
R801
ST801
ST802
C807
C707
TR802
R703
R705
J706
J707
C722
C720
R708
C721
R706
R712
D701
R713
C808
R807
C704
C705
R737
C724
C706
D702
D703
L701
J714
R701
R702
C703
R704
IC701
R707
R709
R710
R711
R714
L804
C723
R733
J704
R732
J705
R715
R719
R717
R718
R716
C717
C716
R721
R720
D704
C715
C714
R728
R727
R726
C711
C710
C709
R723
R722
C809
R734
C719
T701
R731
R729
Q701
C713
C712
R730
R725
C810
D801
R808
P701
P702
P703


LOCAL CONTROL
IR PREA
IC951
SFH505
IC903
IC904
PD6241
DATA
CLK
STB
OSD DATA
OSD CLK
OSD STB
IC901 SDA 20160
IC902
SDA 2526
TEMP. CONT.
TV/MON
SINGLE STANDARD
50/60Hz
TUNER VTXSELECT
SCART SWITCH
+5V
SWITCH BAND I
L-NORM
COLOR
CONTRAST
BRIGHTNESS
VOLUME
ON/OFF
AV
STOP
TEMP. CONTACT
TDA 4605
IC101
90° 14"-22" SMALL RANGE
△ USED PAL MODUL ONLY
* 15"-21" ONLY
PAL/SEC
+200V
+17,5V
+12V
+8,5V
GND


TUNER
TFK 2201 PHC
TCP 611/51
FL 2460
IF MONO MODUL
IC904
PD6241
IC902
SDA 2526
COLOR DECODER
PAL/SECAM OR PAL MODUL
IC501
IC701 TEA 2029
90° 14"-22" SMALL RANGE
TEMP. CONT.
TEMP. CONTACT
SCART SWITCH
OSD BLANKING
OSD OUTPUT
COLOR
CONTRAST
BRIGHTNESS
VOLUME
ON/OFF
AV
STOP
SSC
PAL/NTSC
V-RAMP
V-OUTPUT
H-OUTPUT
H-PULSE


IF MONO MODUL
IC301 TDA 1037
VTX MODUL (OPTIONAL)
SCART
IC501 TDA 4580
CRT MODUL
90° NORMAL NECK
(90° MINI NECK)
UAGC
SCL
SDA
U4 +5V
BAND I
L-NORM
TV/MON
STOP
VOLUME
U2 +17,5V
CCVS
SYNC
SCART SWITCH
SCART BLANKING
SCART BLUE
SCART GREEN
SCART RED
OSD BLANKING
OSD OUTPUT
COLOR
CONTRAST
BRIGHTNESS
Y
-(R-Y)
-(B-Y)
VTX BLANKING
VTX BLUE
VTX GREEN
VTX RED
U3 +12V
+12V
+200V
+125V
-55V H
+55V H
STOP
+17,5V
V-RAMP
V-OUTPUT
H-OUTPUT
H-PULSE
- H-PULSE
H-DRIVE
YOKE
FOKUS
Ug2
FOCUS
G1
G2
EHT
-55V H-PULSE

# MAIN CHASSIS 110° STEREO



## 6. SYNCHRONISATION

| | | | |
|---|---|---|---|
| **6.1** | LINE FREQUENCY LOCKING RANGE | : | +−300 HZ |
| **6.2** | VERTICAL FREQUENCY LOCKING RANGE | : | +−5 HZ |

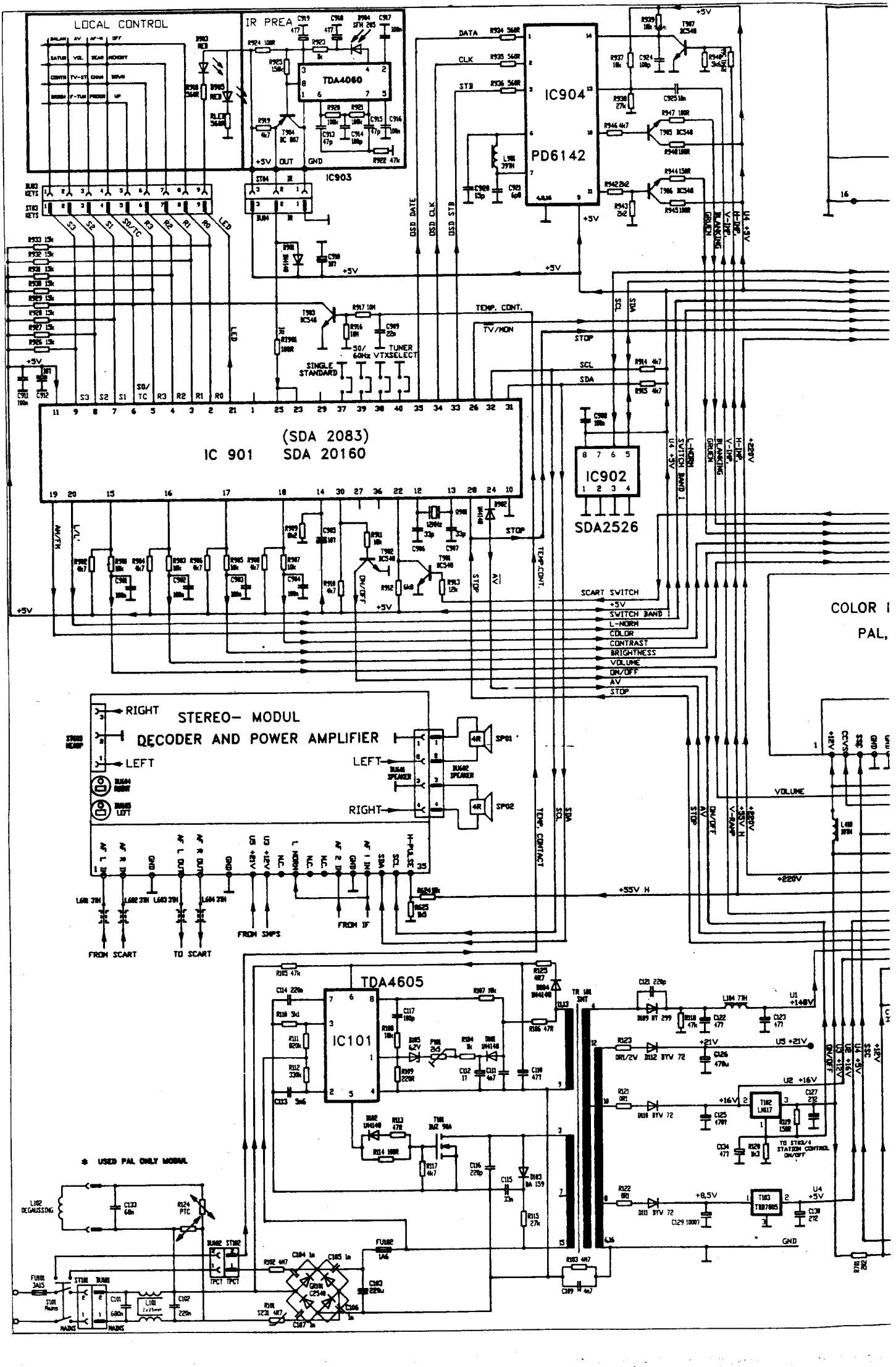
## 7. PICTURE TUBE DRIVE SECTION

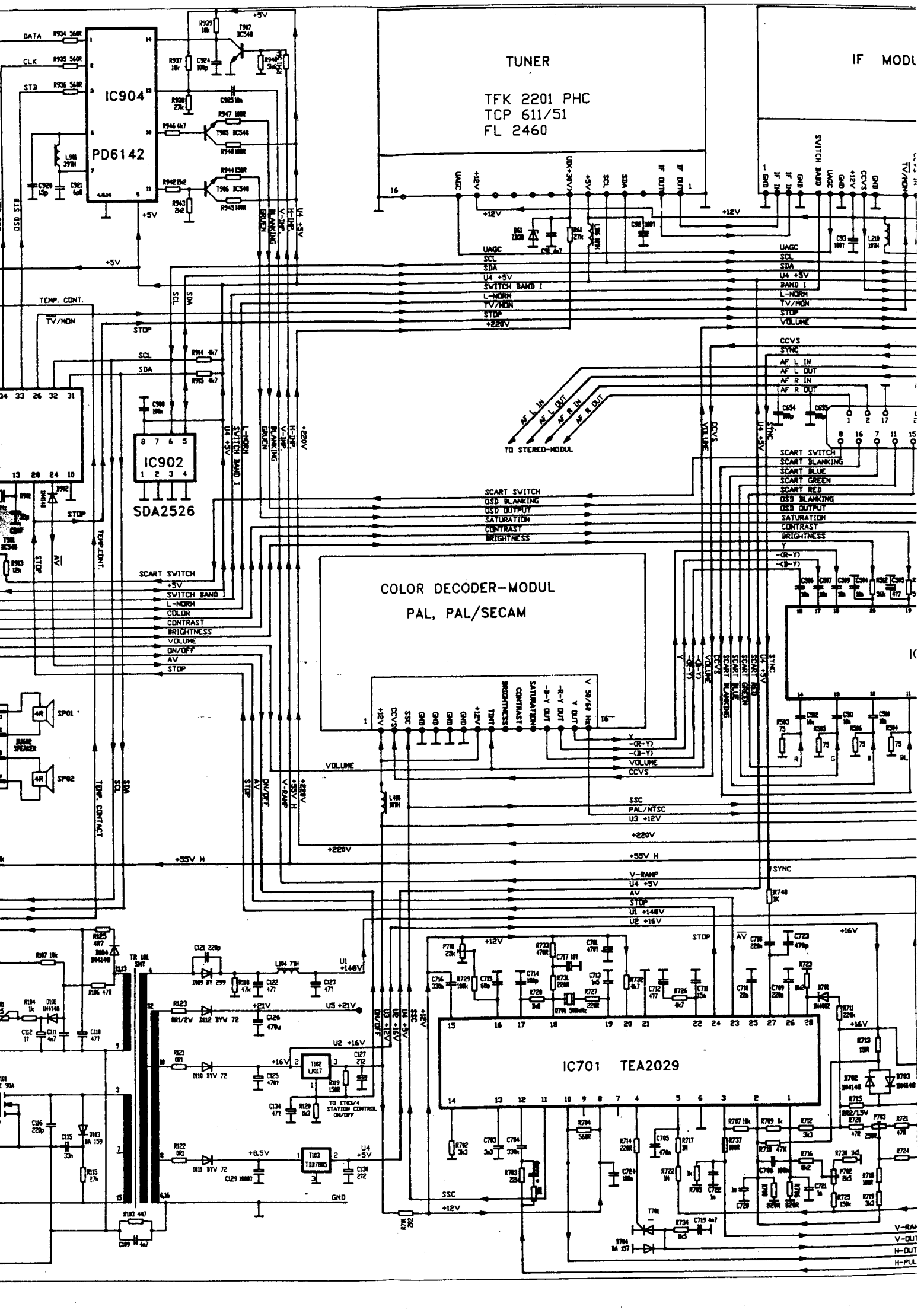
| | | | 20" / 21" | 14" / 15" |
|---|---|---|---|---|
| **7.1** | B+ SUPPLY VOLTAGE (AT Ib=0) | : | 125+− 1 VDC | − − |
| **7.2** | EHT | : | 25.0+−0.5 KV | 23.0−0.5 KV |
| **7.3** | FOCUS VOLTAGE | : | MIN 25.6% | − − |
| | | : | MAX 28% | |
| **7.4** | GRID 2 VOLTAGE RANGE | : | MIN 300 V | − − |
| | | | MAX 1350 V | |
| **7.5** | HEATER VOLTAGE | : | 6.2+−0.2 Vrms | − − |
| **7.6** | FRAME OUTPUT VOLTAGE | : | 250+−8 Vpp | − − |
| **7.7** | 200V OUTPUT | : | 200+−5VDC | − − |
| **7.8** | 12V OUTPUT | : | 12.0+−0.5 VDC | − − |
| **7.9** | 17.5V OUTPUT | : | 17.5+−0.5 VDC | − − |
| **7.10** | 21V OUTPUT | : | | − − |
| **7.11** | 5V OUTPUT | : | 5.0+−0.5 VDC | − − |
| **7.12** | RETRACE TIME | : | 11.0+−0.5 VDC | − − |

## 8. OTHERS

| | | | |
|---|---|---|---|
| **8.1** | AMBIENT OPERATING TEMPERATURE | : | 0−45 DEGRESS C |
| **8.2** | STORAGE TEMPERATURE | : | −10 TO + 85 DEGRESS C |
| **8.3** | POWER CONSUMPTION | : | 90 W (14")<br>90 W (20")<br>90 W (21")<br>10 W (Standby) |
| **8.4** | SAFETY | : | IEC 65 |
| **8.5** | X-RAY RADIATION | : | ACC. IEC 65 |

Components and specification are subject to change for improvment.


LOCAL CONTROL
IR PREA
TDA4060
IC903
IC904
PD6142
DATA
CLK
STB
DSD DATE
DSD CLK
DSD STB
+5V
OUT
GND
KEYS
S3
S2
S1
SD/TC
R3
R2
R1
R0
LED
TEMP. CONT.
TV/HDN
STOP
SCL
SDA
TUNER
VTXSELECT
SINGLE STANDARD
50/60Hz
(SDA 2083)
IC 901 SDA 20160
IC902
SDA2526
SCART SWITCH
SWITCH BAND I
L-NORM
COLOR
CONTRAST
BRIGHTNESS
VOLUME
ON/OFF
AV
STOP
STEREO- MODUL
DECODER AND POWER AMPLIFIER
RIGHT
LEFT
SP01
SP02
FROM SCART
TO SCART
FROM SNPS
FROM IF
+55V H
TDA4605
IC101
VOLUME
+220V
U1 +14BV
U5 +21V
U2 +16V
U4 +5V
+8,5V
GND
* USED PAL ONLY MODUL
DEGAUSSING
MAINS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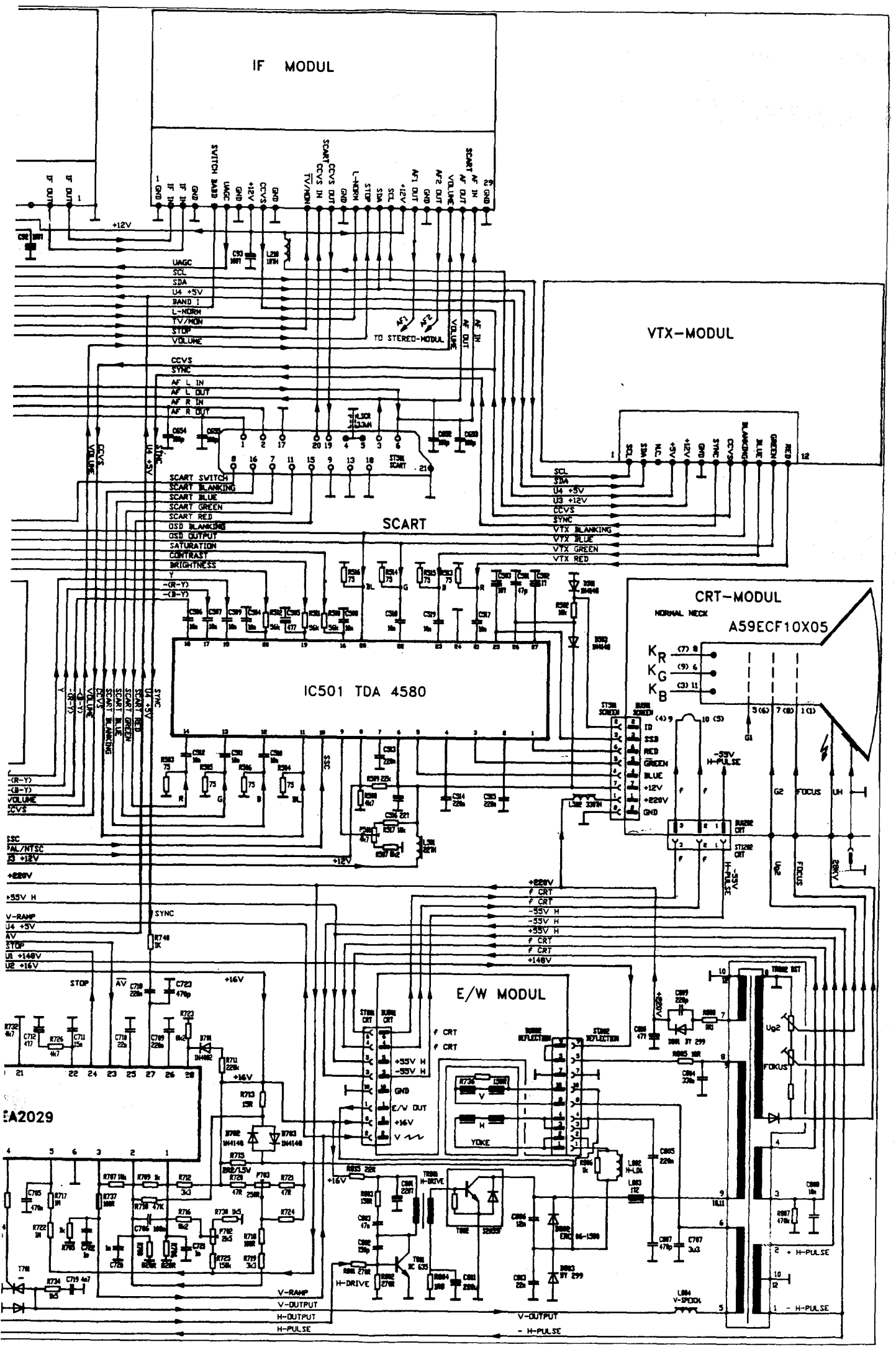
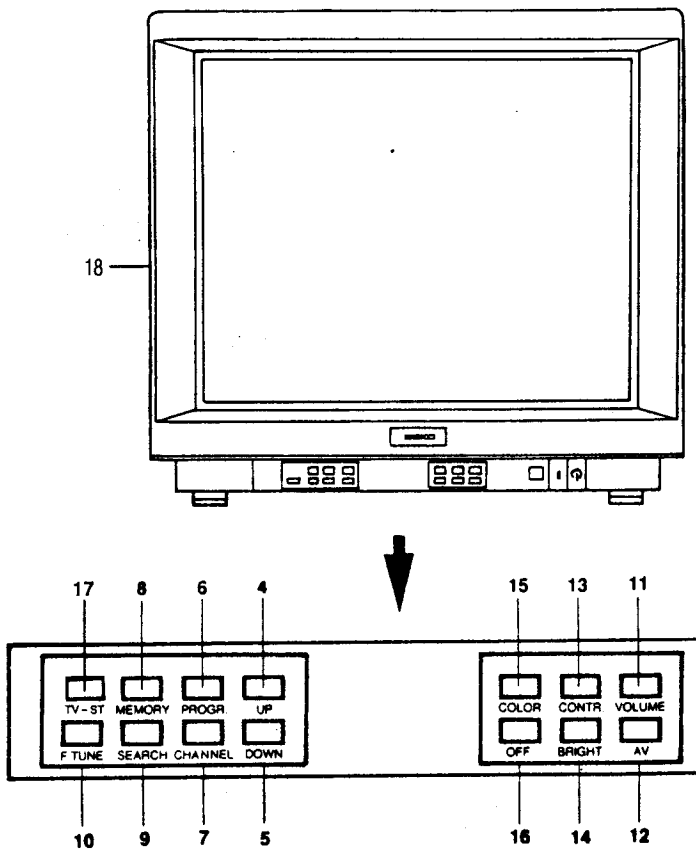
TFK 2201 PHC
TCP 611/51
FL 2460
IC904
PD6142
IC902
SDA2526
TO STEREO-MODUL
COLOR DECODER-MODUL
PAL, PAL/SECAM
IC701 TEA2029
TEMP. CONT.
TV/HON
STOP
SCL
SDA
+5V
+12V
+220V
+55V H
V-RAMP
SCART SWITCH
SCART BLANKING
SCART BLUE
SCART GREEN
SCART RED
OSD BLANKING
OSD OUTPUT
SATURATION
CONTRAST
BRIGHTNESS
VOLUME
CCVS
SYNC
AV
ON/OFF
SSC
PAL/NTSC
U3 +12V
U4 +5V
U5 +21V
U1 +140V
U2 +16V
+8,5V
+16V
+21V
GND
SPO1
SPO2
TO ST63/4 STATION CONTROL ON/OFF


IF MODUL
VTX-MODUL
SCART
IC501 TDA 4580
CRT-MODUL
NORMAL NECK
A59ECF10X05
E/W MODUL
TO STEREO-MODUL
+12V
UAGC
SCL
SDA
U4 +5V
BAND I
L-NORM
TV/MON
STOP
VOLUME
CCVS
SYNC
AF L IN
AF L OUT
AF R IN
AF R OUT
SCART SWITCH
SCART BLANKING
SCART BLUE
SCART GREEN
SCART RED
OSD BLANKING
OSD OUTPUT
SATURATION
CONTRAST
BRIGHTNESS
VTX BLANKING
VTX BLUE
VTX GREEN
VTX RED
U3 +12V
+220V
-55V H
+55V H
+16V
+148V
V-RAMP
V-OUTPUT
H-OUTPUT
H-PULSE
H-DRIVE
FOKUS
EA2029

## LOCATION OF CONTROLS




1. POWER SWITCH
2. OPERATING INDICATOR
3. IR RECEIVER WINDOW
4. UP BUTTON
5. DOWN BUTTON
6. PROGRAM SELECTION BUTTON
7. CHANNEL SELECTION BUTTON
8. MEMORY BUTTON
9. CHANNEL SEARCH BUTTON
10. FINE TUNING BUTTON
11. VOLUME BUTTON
12. AV BUTTON
13. CONTRAST BUTTON
14. BRIGHTNESS BUTTON
15. COLOR BUTTON
16. STAND BY BUTTON
17. TV STANDARD SELECTION BUTTON
18. SPEAKER

Figure 6

## REMOTE CONTROL UNIT

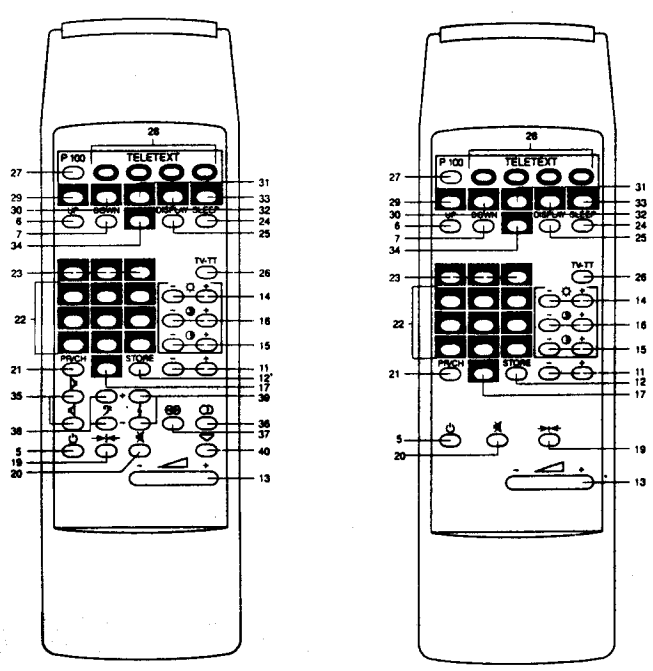



Figure 7

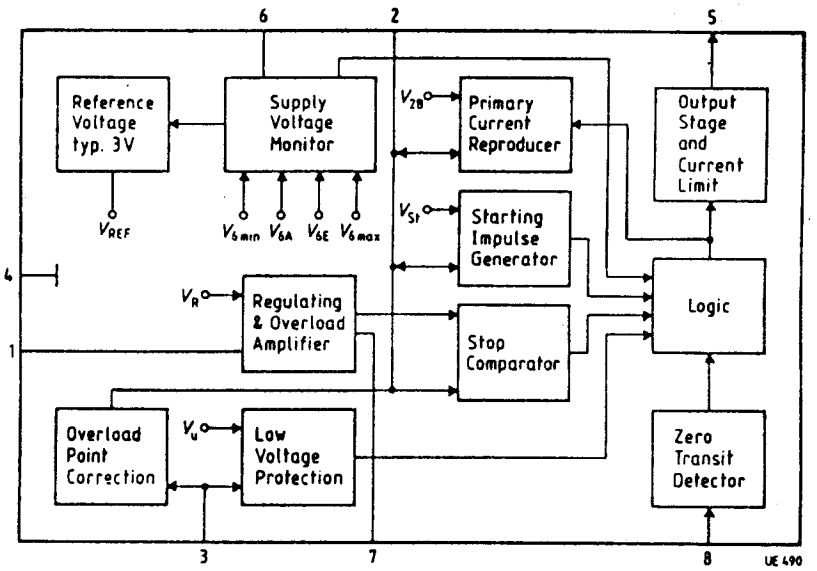
1-Power switch
2-Ir indicator
3-Operating indicator
4-Ir receiver
5-Stand-By button
6-Up button
7-Down button
8-Channel search button
9-Programme selection button
10-Channel selection button
11-Fine tunning button
12-Memory button (press twice to store)
13-Volume adjustment button
14-Brightness adjustment button
15-Contrast adjustment button
16-Colour adjustment buttton*
17-AV button
18-Speakers
19-Normalization button
20-Mute button
21-Programme/channel selection button
22-Ten key buttons
23-Two digit buttons
24-Sleep timer button
25-Display button
26-Teletext selection button*
27-Index page button (P100)*
28-Colour linket buttons*
29-Reveal*
30-Subpage*
31-Double height*
32-Update*
33-Clock*
34-Stop*
35-Balance buttons**
36-Quasi-Stereo**
37-Space Wide**
38-Bass Controls**
39-Treble Controls**
40-Stereo/Mono (Dual/A-Dual/B)**

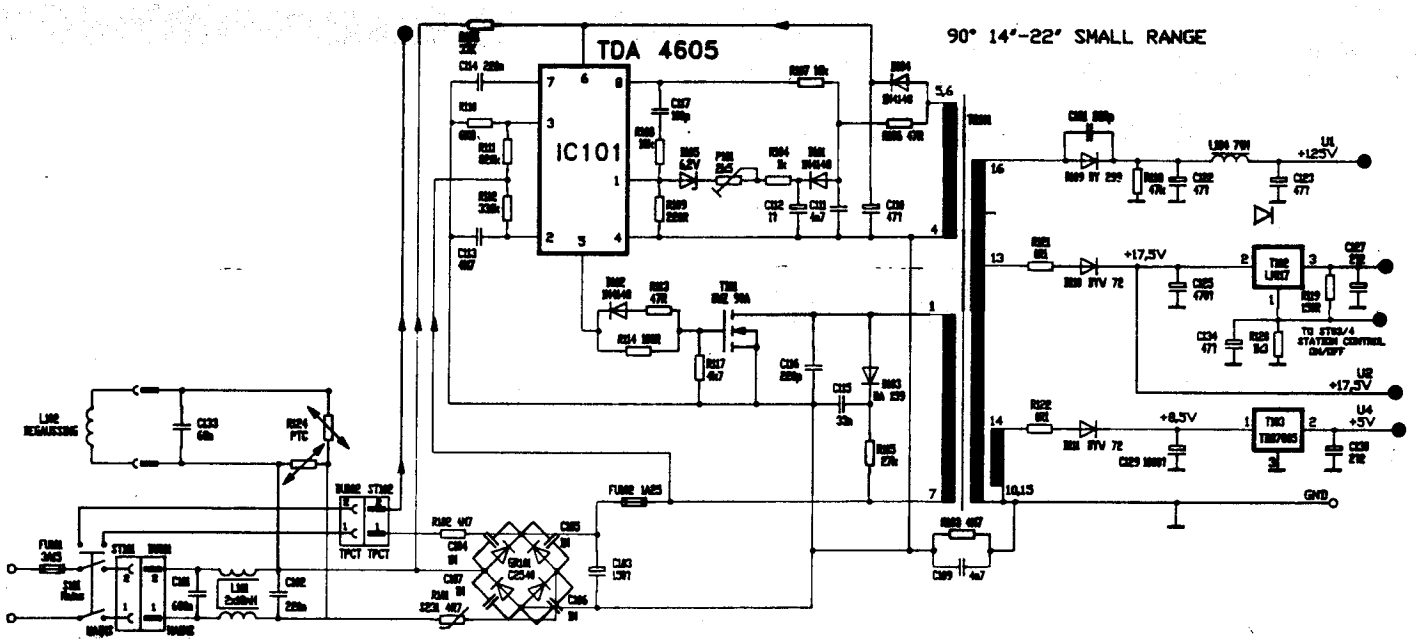
* These buttons are for TELETEXT use only
** These buttons are for STEREO function only.

## POWER SUPPLY

TDA 4605
Control IC for Switched-Mode
Power Supplies using
MOS Transistors

Block Diagram




## START UP

When TV is switched ON a start voltage (9V) is generated over R105 at pin 6 of IC 101, TDA4605. IC101 produces a 50 kHz squarewave, whic is supplied to the base of T101, BUZ90A over D102, R113 and R114. Collector of T101 is connected to 330 V with switch mode transformer TR101. 330 V is chopped at primary side of the transformer. This generates varios voltages at pins 5, 6, 13, 14, 16 of the secondary side of the transformer TR101.

## NORMAL OPERATION

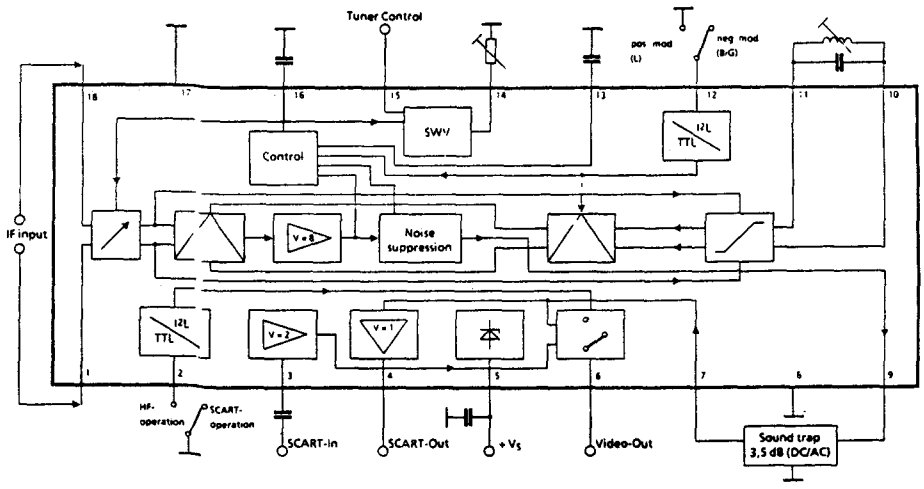
Voltage from pin 5, 6 of transformer TR101 is reftified with D104 and applied to pin 6 of IC101. When this stable voltage 12 V DC reaches pin 6, start voltage is interrupted.

## VOLTAGE REGULATION

Voltage obtained from D104 goes over D101, R104, P101, D105 6.2 zener diod to pin 1 of IC101, TDA 4605. This circuit regulates the main supply voltage U1 125V. Pin 8 of IC101 is connected over R107 to pin 8 of TR101, which performs automatic voltage control.

# TDA 5931- 6 VİDEO–IF AMPLİFİER AND DEMODULATOR WITH FULLSCART

## Block Diagram



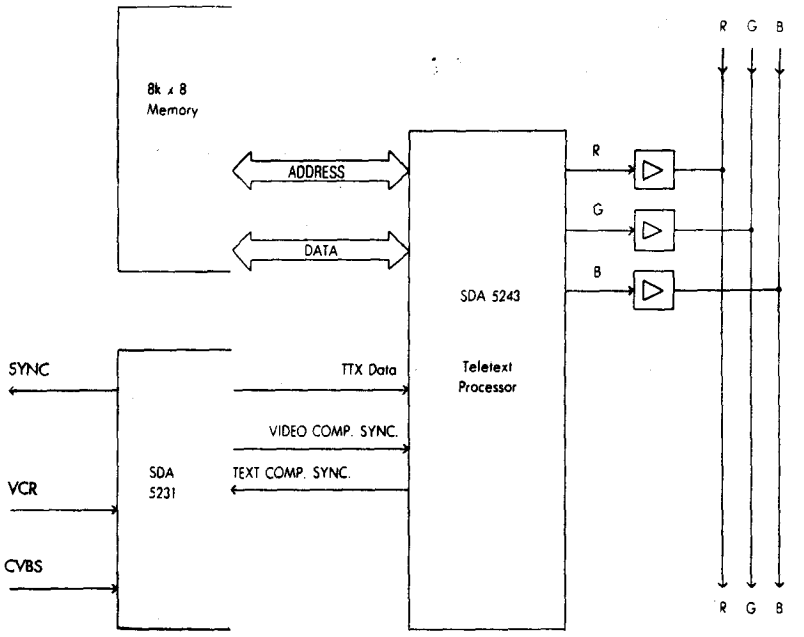

## Pin Functions

1 Video IF input
2 SCART Switch A / W
3 SCART input
4 SCART Input Output
5 Supply voltage
6 Positive video output
7 Video output of the sound trap (2 Vp
8 Ground
9 Video input of the sound trap (3 Vpp
10 Demodulator tank circuit
11 Demodulator tank circuit
12 TV standart switch-over (B/G) - (L)
13 Low-pass filter (averaging)
14 Tuner AGC threshold
15 Tuner AGC output
16 AGC time constant
17 Ground
18 Video IF input

## Circuit Description

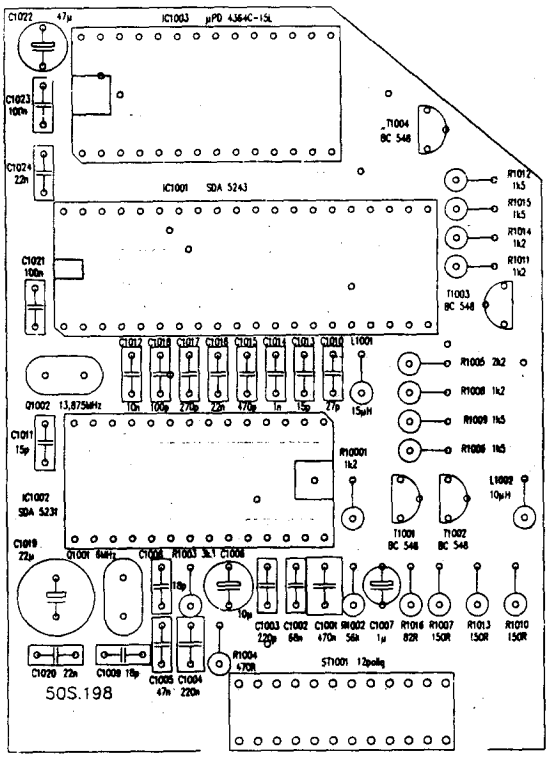
The component includes a four-stage, capacitatively coupled, symmetrically designed and controlled amplifier a limiter with selection, and a mixer for quasi-synchronous demodulation of positive and negative modulated IF signals. In addition a video output amplifier and noise suppression circuitry are included. This output is used for generating the AGC voltage. The AGC for both modulation types has been realized as integral AGC with noise free peak and mean value detector (only for positive modulation). For SCART applications this output is switched a video switch with two inputs (for the demodulator signal or SCART socket) and two outputs (SCART-and TV output). The demodulator output (pin 9) provides a video signal output level 3 dB higher than the level required for the operation of the TV set or to drive the SCART connector. Therefore it is possible to insert a sound trap inbetween this output and the input of the SCART switch (pin 7). The insertion loss of the sound trap has to attenuate the signal level at pin 9 by a factor 2/3 or 3 dB (AC and DC) to avoid distortions in the SCART switch.

The delayed tuner AGC is generated by a threshold amplifier driven by the control voltage. The amplifier response can be controlled by means of an external potentiometer. (The increase of the tuner AGC voltage shall create a higher tuner gain = positive control)

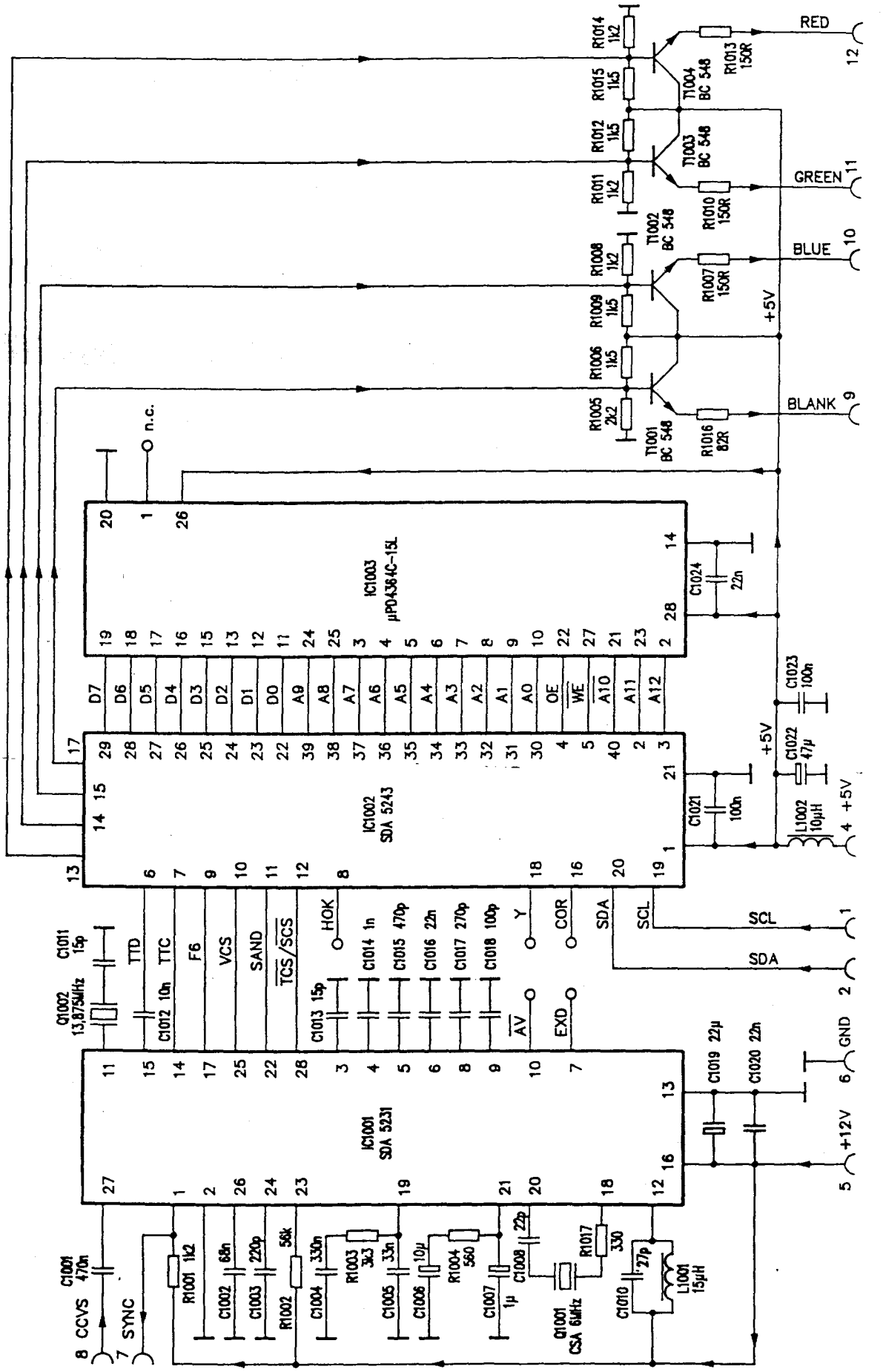



**TELETEXT DECODER BLOCK DIAGRAM**

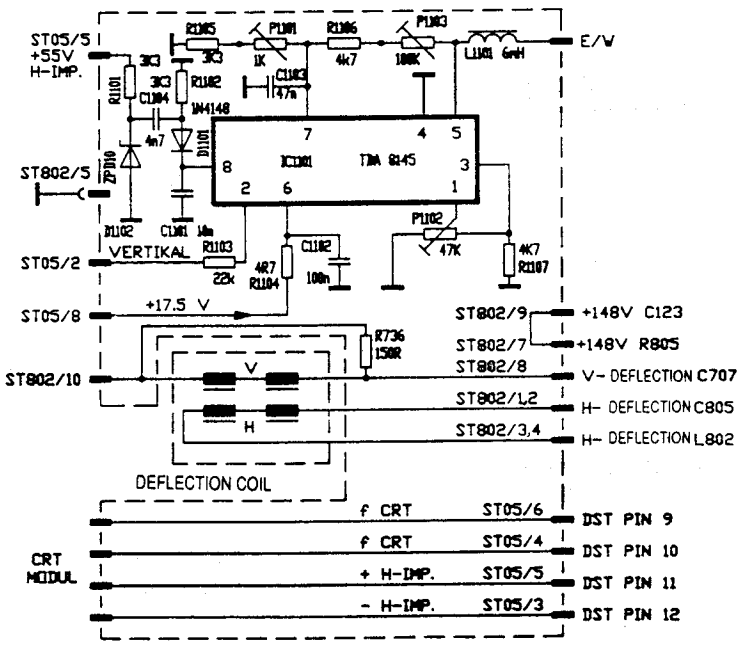
## TELETEXT MODULE PATTERN DRAWINGS



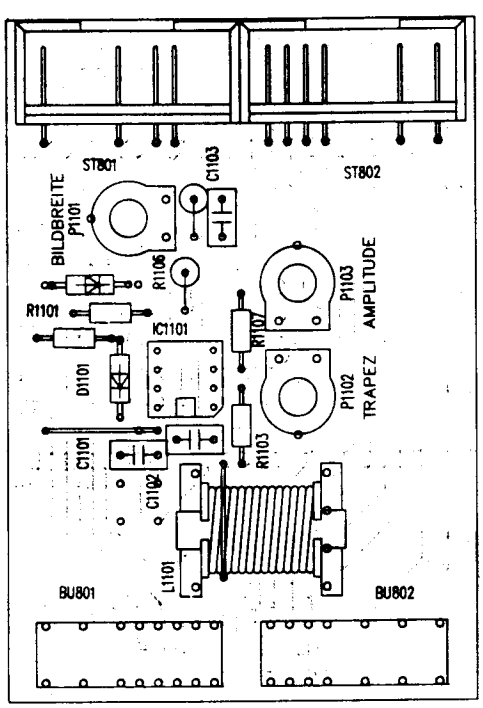
## TELETEXT MODULE

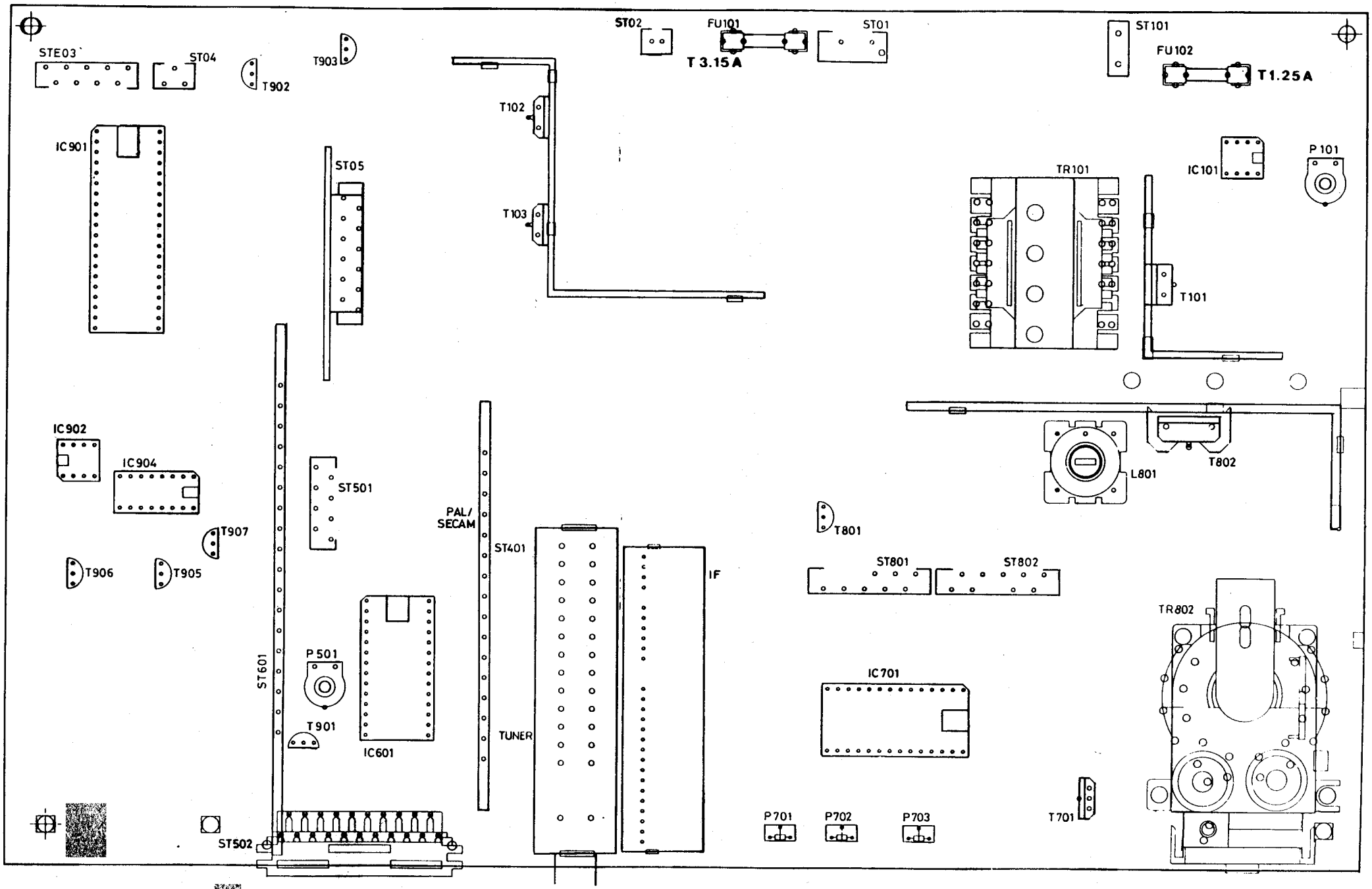


## EAST/WEST MODULE



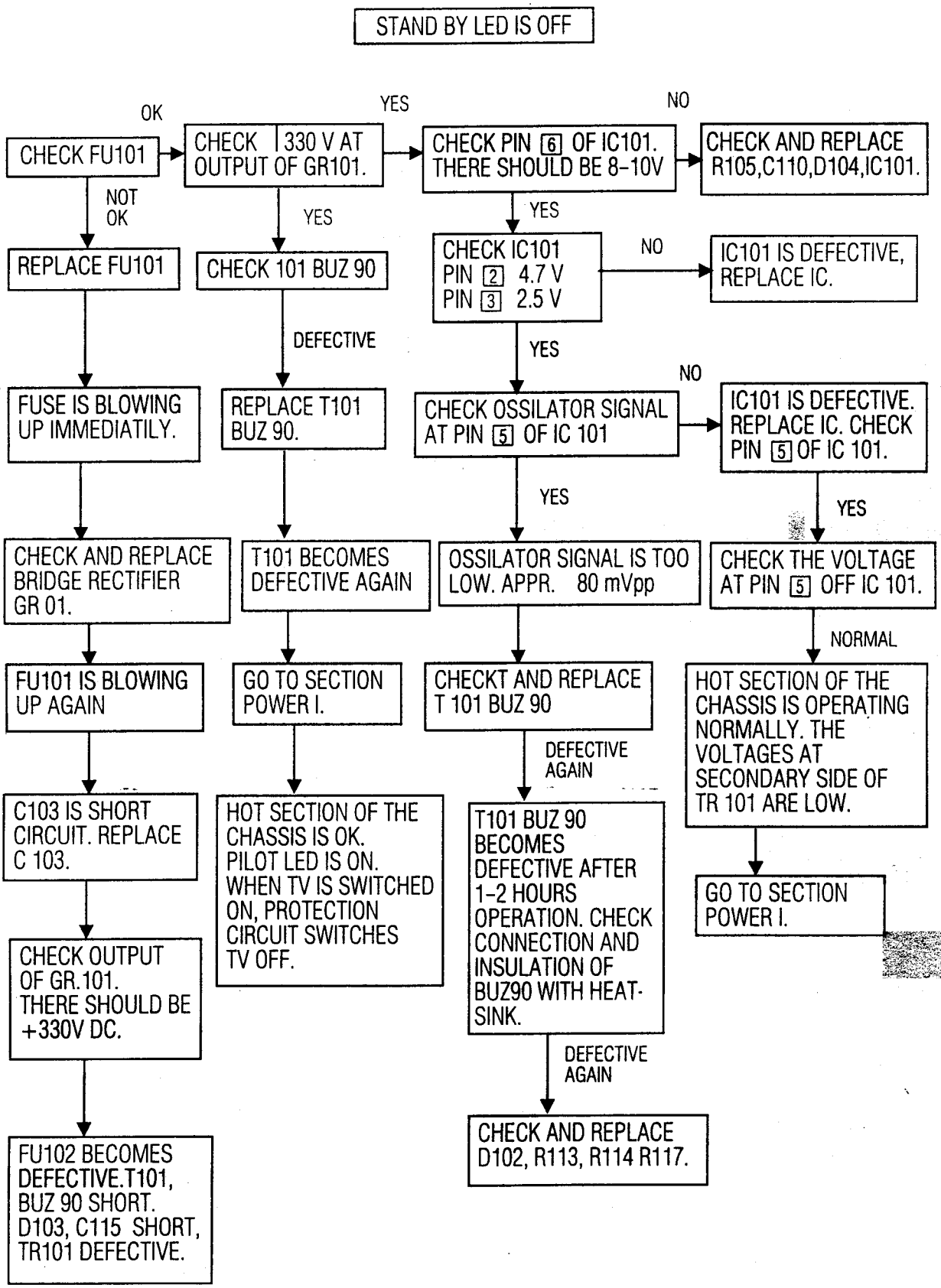

## EAST/WEST MODULE PATTERN DRAWING



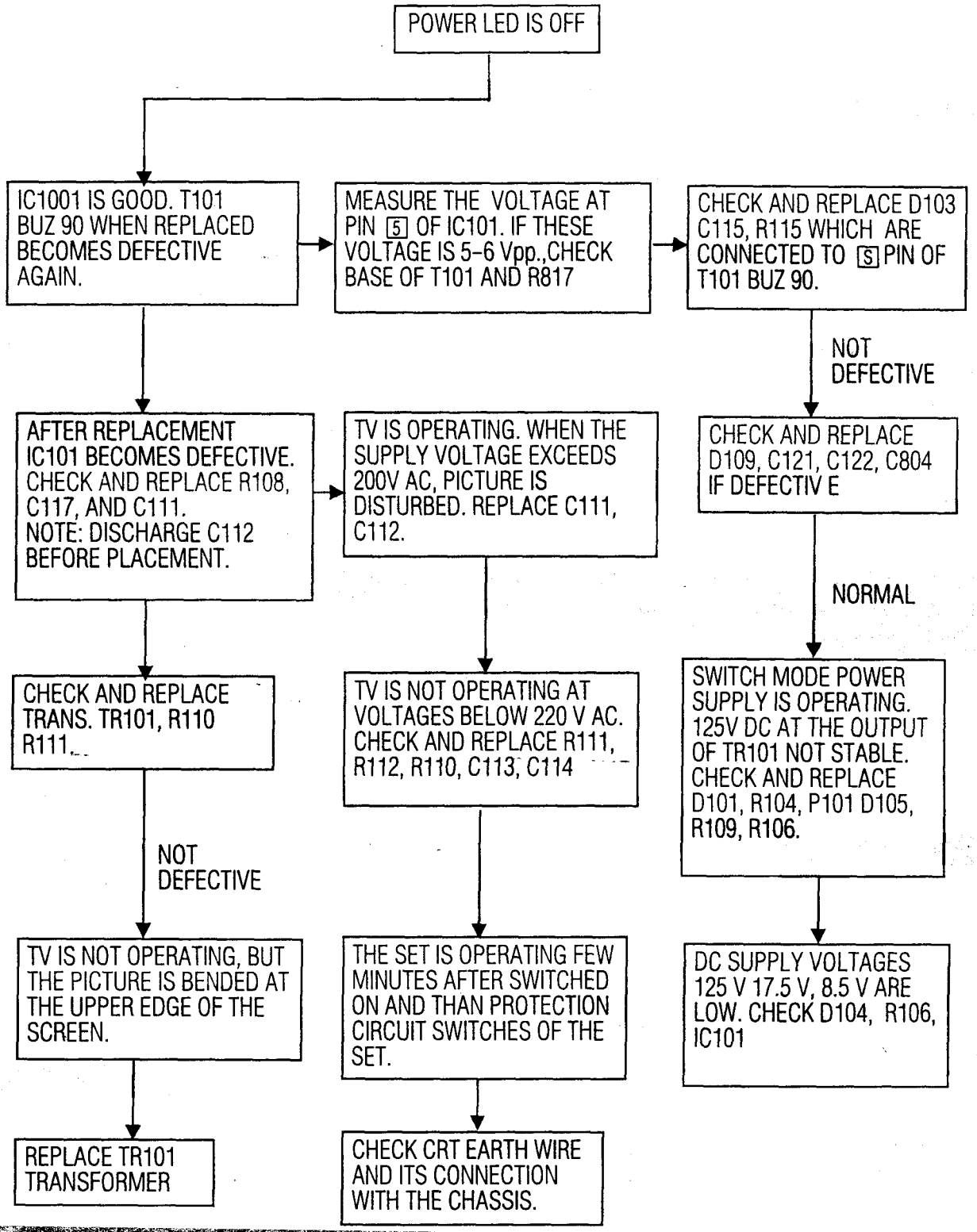



**LOCATION DIAGRAM OF PARTS ON THE MAIN CHASSIS**

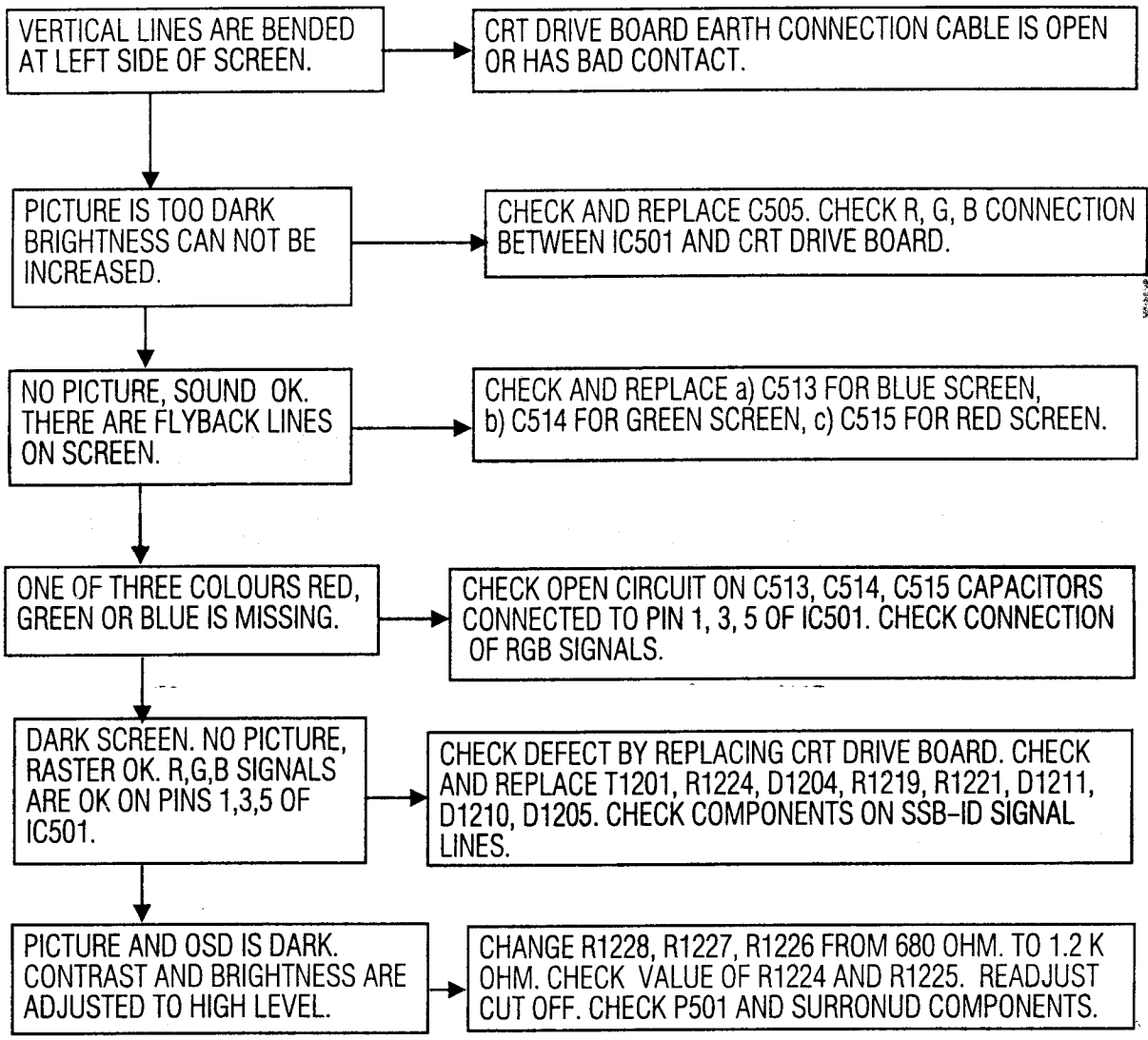
## ② NO OPERATION


STAND BY LED IS OFF
CHECK FU101
OK
NOT OK
CHECK 330 V AT OUTPUT OF GR101.
YES
CHECK PIN 6 OF IC101. THERE SHOULD BE 8-10V
NO
CHECK AND REPLACE R105,C110,D104,IC101.
REPLACE FU101
CHECK 101 BUZ 90
YES
CHECK IC101 PIN 2 4.7 V PIN 3 2.5 V
NO
IC101 IS DEFECTIVE, REPLACE IC.
DEFECTIVE
REPLACE T101 BUZ 90.
YES
FUSE IS BLOWING UP IMMEDIATILY.
CHECK OSSILATOR SIGNAL AT PIN 5 OF IC 101
NO
IC101 IS DEFECTIVE. REPLACE IC. CHECK PIN 5 OF IC 101.
YES
YES
CHECK AND REPLACE BRIDGE RECTIFIER GR 01.
T101 BECOMES DEFECTIVE AGAIN
OSSILATOR SIGNAL IS TOO LOW. APPR. 80 mVpp
CHECK THE VOLTAGE AT PIN 5 OFF IC 101.
NORMAL
FU101 IS BLOWING UP AGAIN
GO TO SECTION POWER I.
CHECKT AND REPLACE T 101 BUZ 90
HOT SECTION OF THE CHASSIS IS OPERATING NORMALLY. THE VOLTAGES AT SECONDARY SIDE OF TR 101 ARE LOW.
DEFECTIVE AGAIN
C103 IS SHORT CIRCUIT. REPLACE C 103.
HOT SECTION OF THE CHASSIS IS OK. PILOT LED IS ON. WHEN TV IS SWITCHED ON, PROTECTION CIRCUIT SWITCHES TV OFF.
T101 BUZ 90 BECOMES DEFECTIVE AFTER 1-2 HOURS OPERATION. CHECK CONNECTION AND INSULATION OF BUZ90 WITH HEAT-SINK.
GO TO SECTION POWER I.
CHECK OUTPUT OF GR.101. THERE SHOULD BE +330V DC.
DEFECTIVE AGAIN
FU102 BECOMES DEFECTIVE.T101, BUZ 90 SHORT. D103, C115 SHORT, TR101 DEFECTIVE.
CHECK AND REPLACE D102, R113, R114 R117.

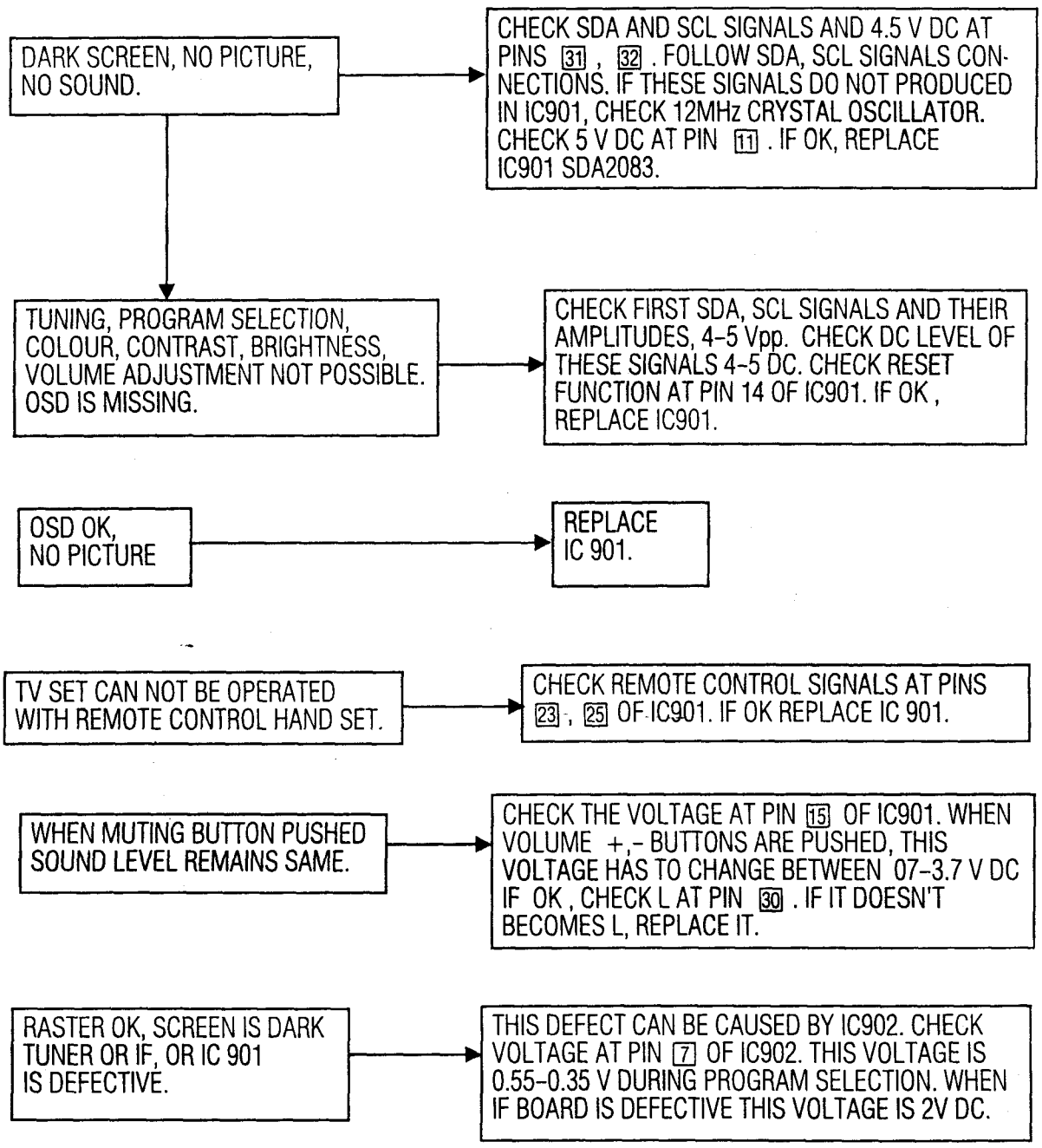
# ③ POWER I DEFECTS


POWER LED IS OFF
IC1001 IS GOOD. T101 BUZ 90 WHEN REPLACED BECOMES DEFECTIVE AGAIN.
MEASURE THE VOLTAGE AT PIN [5] OF IC101. IF THESE VOLTAGE IS 5-6 Vpp.,CHECK BASE OF T101 AND R817
CHECK AND REPLACE D103 C115, R115 WHICH ARE CONNECTED TO [5] PIN OF T101 BUZ 90.
NOT DEFECTIVE
AFTER REPLACEMENT IC101 BECOMES DEFECTIVE. CHECK AND REPLACE R108, C117, AND C111. NOTE: DISCHARGE C112 BEFORE PLACEMENT.
TV IS OPERATING. WHEN THE SUPPLY VOLTAGE EXCEEDS 200V AC, PICTURE IS DISTURBED. REPLACE C111, C112.
CHECK AND REPLACE D109, C121, C122, C804 IF DEFECTIV E
NORMAL
CHECK AND REPLACE TRANS. TR101, R110 R111.
TV IS NOT OPERATING AT VOLTAGES BELOW 220 V AC. CHECK AND REPLACE R111, R112, R110, C113, C114
SWITCH MODE POWER SUPPLY IS OPERATING. 125V DC AT THE OUTPUT OF TR101 NOT STABLE. CHECK AND REPLACE D101, R104, P101 D105, R109, R106.
NOT DEFECTIVE
TV IS NOT OPERATING, BUT THE PICTURE IS BENDED AT THE UPPER EDGE OF THE SCREEN.
THE SET IS OPERATING FEW MINUTES AFTER SWITCHED ON AND THAN PROTECTION CIRCUIT SWITCHES OF THE SET.
DC SUPPLY VOLTAGES 125 V 17.5 V, 8.5 V ARE LOW. CHECK D104, R106, IC101
REPLACE TR101 TRANSFORMER
CHECK CRT EARTH WIRE AND ITS CONNECTION WITH THE CHASSIS.

## (11)
# CRT DRIVE BOARD AND IC501 DEFECTS

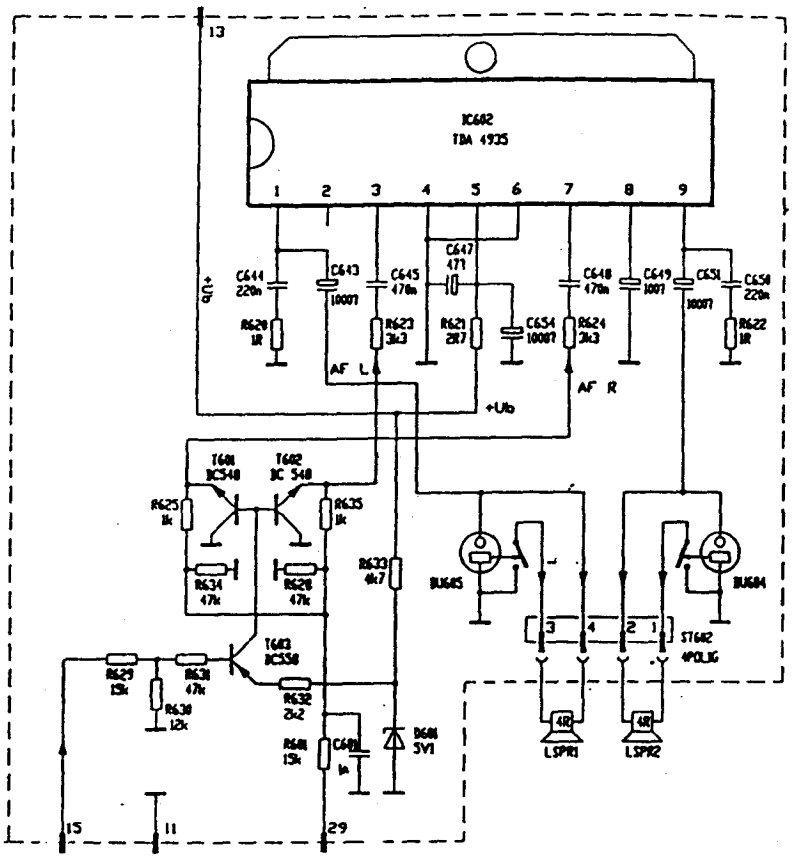

VERTICAL LINES ARE BENDED AT LEFT SIDE OF SCREEN.
CRT DRIVE BOARD EARTH CONNECTION CABLE IS OPEN OR HAS BAD CONTACT.
PICTURE IS TOO DARK BRIGHTNESS CAN NOT BE INCREASED.
CHECK AND REPLACE C505. CHECK R, G, B CONNECTION BETWEEN IC501 AND CRT DRIVE BOARD.
NO PICTURE, SOUND OK. THERE ARE FLYBACK LINES ON SCREEN.
CHECK AND REPLACE a) C513 FOR BLUE SCREEN, b) C514 FOR GREEN SCREEN, c) C515 FOR RED SCREEN.
ONE OF THREE COLOURS RED, GREEN OR BLUE IS MISSING.
CHECK OPEN CIRCUIT ON C513, C514, C515 CAPACITORS CONNECTED TO PIN 1, 3, 5 OF IC501. CHECK CONNECTION OF RGB SIGNALS.
DARK SCREEN. NO PICTURE, RASTER OK. R,G,B SIGNALS ARE OK ON PINS 1,3,5 OF IC501.
CHECK DEFECT BY REPLACING CRT DRIVE BOARD. CHECK AND REPLACE T1201, R1224, D1204, R1219, R1221, D1211, D1210, D1205. CHECK COMPONENTS ON SSB-ID SIGNAL LINES.
PICTURE AND OSD IS DARK. CONTRAST AND BRIGHTNESS ARE ADJUSTED TO HIGH LEVEL.
CHANGE R1228, R1227, R1226 FROM 680 OHM. TO 1.2 K OHM. CHECK VALUE OF R1224 AND R1225. READJUST CUT OFF. CHECK P501 AND SURRONUD COMPONENTS.

# ⑫
# MICROPROCESSOR IC 901 AND PERIPHERIAL CIRCUITRY DEFECTS

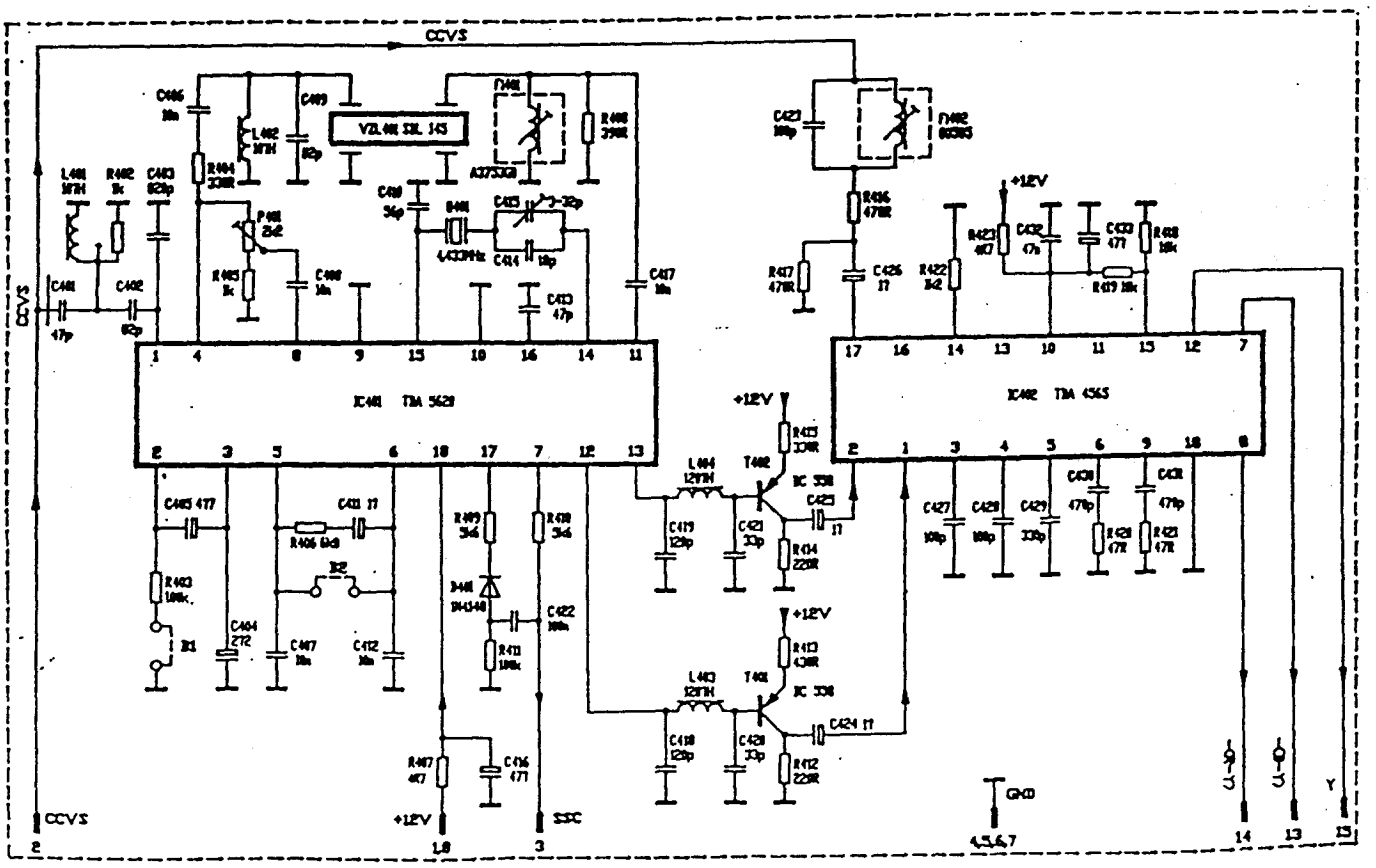

DARK SCREEN, NO PICTURE, NO SOUND.
CHECK SDA AND SCL SIGNALS AND 4.5 V DC AT PINS 31 , 32 . FOLLOW SDA, SCL SIGNALS CONNECTIONS. IF THESE SIGNALS DO NOT PRODUCED IN IC901, CHECK 12MHz CRYSTAL OSCILLATOR. CHECK 5 V DC AT PIN 11 . IF OK, REPLACE IC901 SDA2083.
TUNING, PROGRAM SELECTION, COLOUR, CONTRAST, BRIGHTNESS, VOLUME ADJUSTMENT NOT POSSIBLE. OSD IS MISSING.
CHECK FIRST SDA, SCL SIGNALS AND THEIR AMPLITUDES, 4-5 Vpp. CHECK DC LEVEL OF THESE SIGNALS 4-5 DC. CHECK RESET FUNCTION AT PIN 14 OF IC901. IF OK , REPLACE IC901.
OSD OK, NO PICTURE
REPLACE IC 901.
TV SET CAN NOT BE OPERATED WITH REMOTE CONTROL HAND SET.
CHECK REMOTE CONTROL SIGNALS AT PINS 23 , 25 OF IC901. IF OK REPLACE IC 901.
WHEN MUTING BUTTON PUSHED SOUND LEVEL REMAINS SAME.
CHECK THE VOLTAGE AT PIN 15 OF IC901. WHEN VOLUME +,- BUTTONS ARE PUSHED, THIS VOLTAGE HAS TO CHANGE BETWEEN 07-3.7 V DC IF OK , CHECK L AT PIN 30 . IF IT DOESN'T BECOMES L, REPLACE IT.
RASTER OK, SCREEN IS DARK TUNER OR IF, OR IC 901 IS DEFECTIVE.
THIS DEFECT CAN BE CAUSED BY IC902. CHECK VOLTAGE AT PIN 7 OF IC902. THIS VOLTAGE IS 0.55-0.35 V DURING PROGRAM SELECTION. WHEN IF BOARD IS DEFECTIVE THIS VOLTAGE IS 2V DC.

BEKO

# AF POWER AMPLIFIER FOR TV MODEL 11225T/15225T/16228T




## PAL DECODER



BEKO

# NICAM DROP OUT ALIGNMENT PROCEDURE

Nicam drop out can occur on TV switch on or may occur when the CTV has thoroughly warmed up.

In either instances the procedure for correcting the problem is as follows:-

1. Equipment required : Digital volt meter and non metallic trimmer

2. Remove back cover, connect up receiver to power supply and a good Nicam aerial signal.

3. Switch the receiver on to obtain picture and sound

   **The following alignment procedure should be carried out within 5 minutes of switch on, on a good quality Nicam transmission.**

Alignment procedure for drop out after TV warm up

A. Connect the volt meter to Pin 1 of IC603 (TDA 8732).

B. C678 (variable capacitor and located on the Nicam PCB) should be carefully adjusted until the voltage on Pin 1 IC603 measures 2.8/2.9V (DC).

   NOTE: C678 rotates through 360° and so a careful and slow adjustment is required.

Alignment procedure for drop out on switch on

If Nicam drop out happens on switch on the voltage reading on Pin 1 of IC603 will be inaccurate and cannot be used for the setting up procedure.

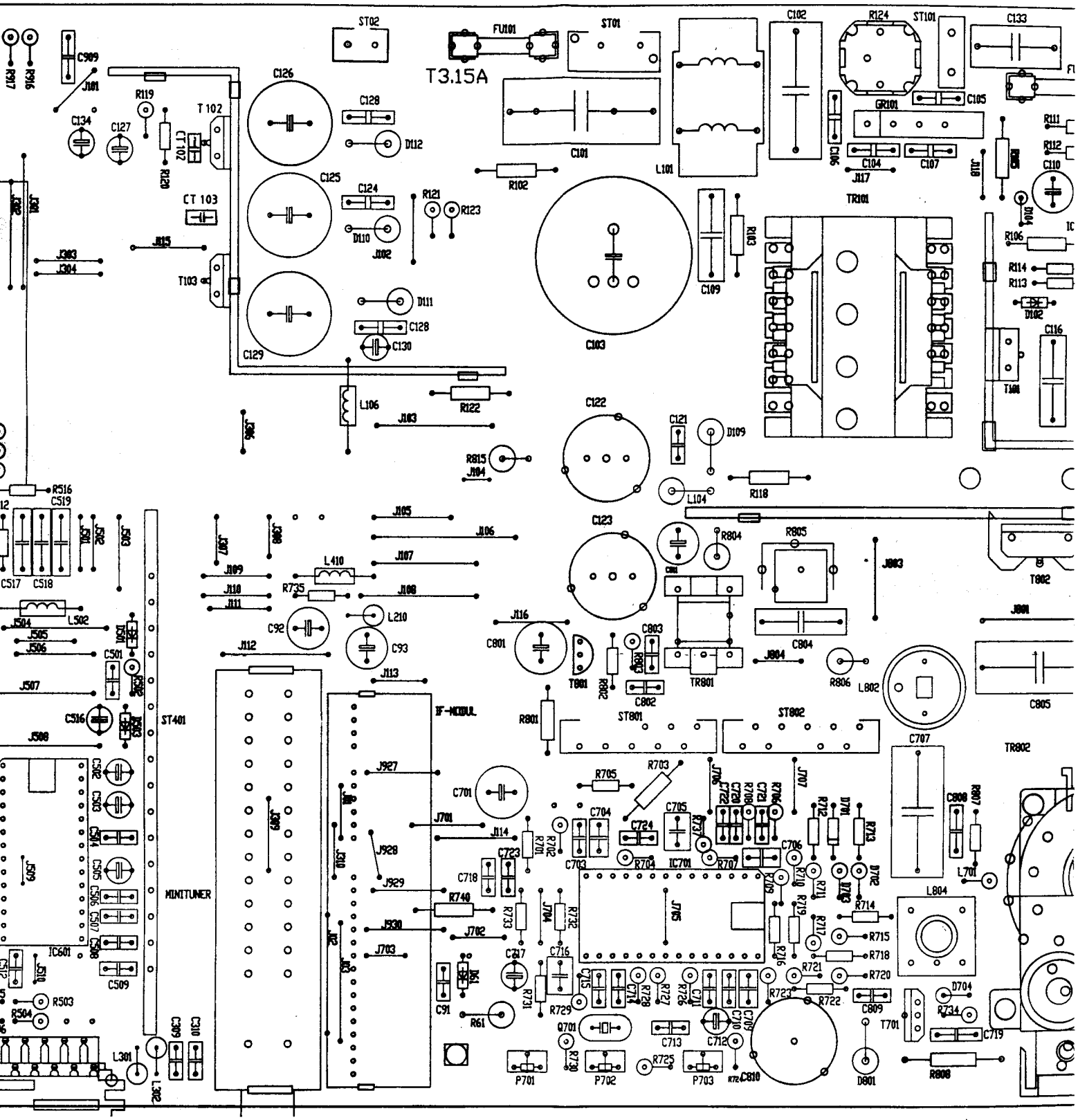
In this instance C678 must be adjusted slowly and until the Nicam OSD flashing stops.

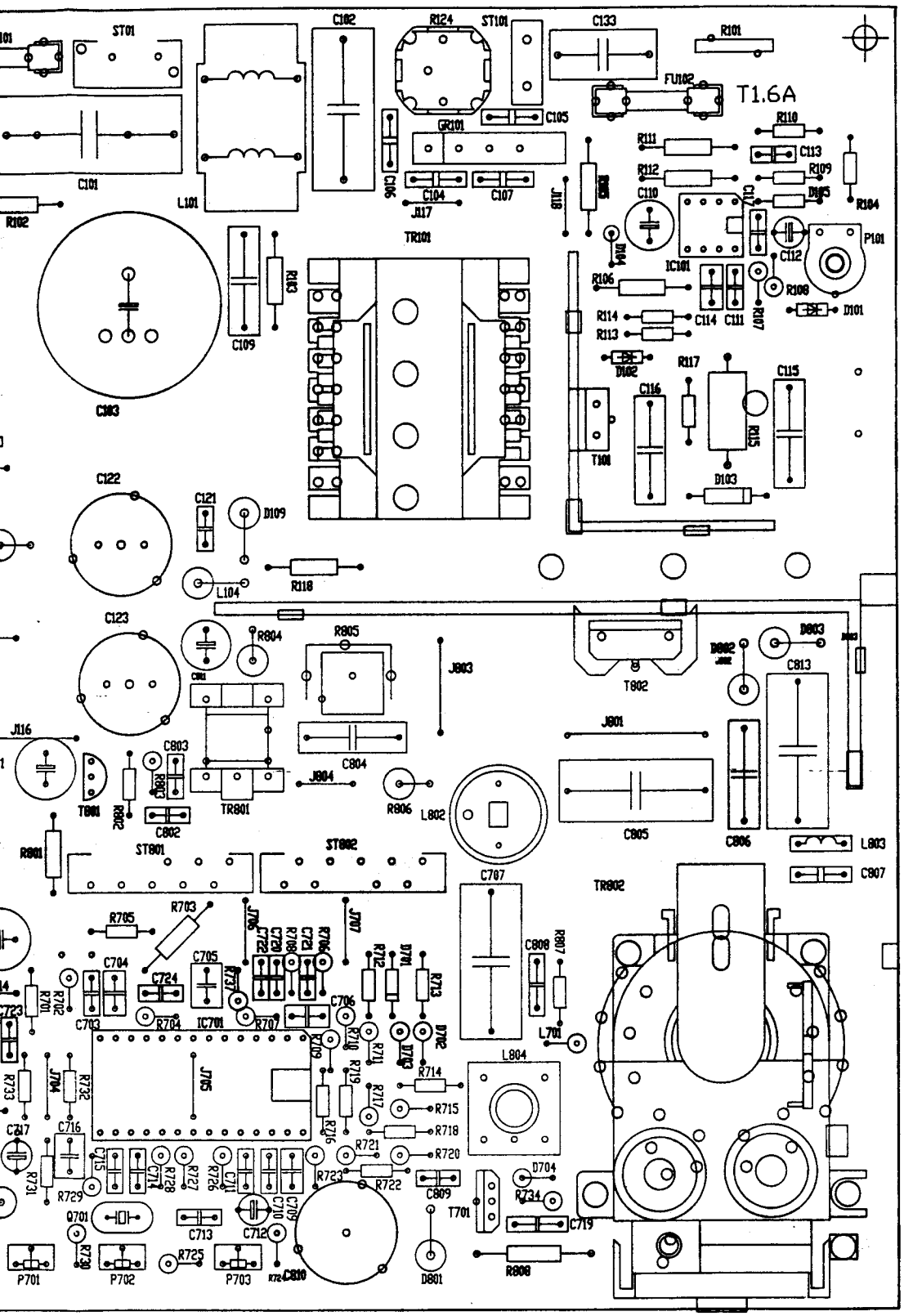
When the Nicam OSD flashing has ceased proceed as directed above, sections 'A' and 'B'.

Other

1. The voltage varies on Pin 1 of IC603 as the receiver "warms up" and normally the voltage drops. Therefore if the voltage is measured again after about 30 minutes it will have fallen below the set level (2.8/2.9V). The capacitor must not be readjusted. The fact the voltage has varied is a normal part of receiver operation process.

2. If the problem recurs after the TV has warmed up, or if the setting up voltage can not be achieved, replace crystal Q4 and re-set C678.


T3.15A
MINITUNER
IF-MODUL
ST401
ST801
ST802
TR101
TR801
TR802
IC601
IC701
ST01
ST02
FU101
ST101
GR101
T 102
CT 102
CT 103
T103
T701
T801
T802
L101
L104
L106
L210
L301
L302
L410
L502
L701
L802
L804
P701
P702
P703
Q701
D801
D109
D110
D111
D112
C101
C102
C103
C109
C122
C123
C129
C133
R102
R118
R122
R124
R735
R801
R804
R805
J927
J928
J929
J930
J931
J932
J933
J934


T1.6A
ST101
C133
R101
FU102
C105
GR101
R110
C113
R109
R104
C101
L101
C102
C106
C104
C107
J117
TR101
J119
R111
R112
C110
C112
P101
IC101
R106
R108
D101
R114
R113
C114
C111
R107
D102
R117
C115
C116
R115
T101
D103
R103
C109
C103
C122
C121
D109
L104
R118
C123
R804
R805
J803
T802
D803
D802
C813
J116
C803
J801
C804
J804
TR801
R806
L802
C805
C806
L803
C907
R801
R802
T801
ST801
ST802
C707
TR802
R705
R703
J706
J707
C704
C705
C724
C722
C723
R708
C721
R712
D711
R713
C808
R807
L701
C706
C703
R704
IC701
R707
R710
R711
D703
D702
R709
R719
R714
L804
J705
R733
J704
R732
R715
R717
R718
C717
C716
R721
R720
C715
C714
R728
R727
C711
R726
R723
R722
C809
D704
R734
C719
R729
R731
Q701
C713
C712
C710
C708
T701
R730
R725
C810
D801
R808
P701
P702
P703